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Forest Pest Conditions In The Maritimes 1982

Laszlo P. Magasi
Maritimes Forest Research Centre

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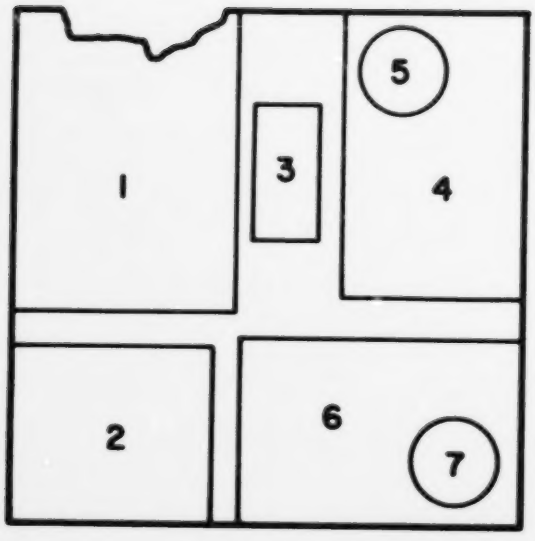
MARITIMES FOREST RESEARCH CENTRE

The Maritimes Forest Research Centre (MFRC) is one of six regional establishments of the Canadian Forestry Service, within Environment Canada. The Centre conducts a program of work directed toward the solution of major forestry problems and the development of more effective forest management techniques for use in the Maritime Provinces.

The program consists of two major elements - research and development, and technical and information services. Most research and development work is undertaken in direct response to the needs of forest management agencies, with the aim of improving the protection, growth, and value of the region's forest resource for a variety of consumptive and non-consumptive uses; studies are often carried out jointly with provincial governments and industry. The Centre's technical and information services are designed to bring research results to the attention of potential users, to demonstrate new and improved forest management techniques, to assist management agencies in solving day-to-day problems, and to keep the public fully informed on the work of the Maritimes Forest Research Centre.



GYPSY MOTH

1) Burlap larval trap in an oak stand
2) Larvae resting on tree trunk
3) Late instar larva – actual size
4) Sex attractant baited adult trap
5) Male moth – actual size
6) Egg masses on tree trunk
7) Female moth – actual size

FOREST PEST CONDITIONS IN THE MARITIMES IN 1982

by

Laszlo P. Magasi

Maritimes Forest Research Centre

Fredericton, New Brunswick

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ABSTRACT

This report reviews the status of forest insects and diseases in the Maritimes Region in 1982, damage related to forest inventory data, and a forecast of conditions for 1983, when appropriate. Fifteen economically important insects and diseases are discussed in detail. A chapter on special surveys provides information on the results of a white spruce plantation assessment survey, cone and seed damage of white spruce, and of cyclical pest reviews. Information on other organisms is listed in tabular form. A list of forest-pest related publications and reports is included. More detailed information is available on request from the Maritimes Forest Research Centre.

RESUME

Ce rapport fait le bilan des insects forestiers et des maladies des arbres dans la région des Maritimes en 1982, y compris les dégâts de nature économique, et donne un aperçu des conditions prévues pour 1983. L'auteur traite en détail de 15 insectes et maladies d'importance et énumère les autres organismes sous forme tabulaire. Un chapitre affecté aux inventaires donne de l'information sur les résultats d'une étude sur les plantations d'épinette blanche, les dégâts aux cônes et semences d'épinette blanche, et fait la revue des ravageurs cycliques. Il y inclut également une compilation de rapports et de publications traitant de ravageurs forestiers. De plus amples renseignements sont disponibles sur demande au Centre de recherches forestières des Maritimes.

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INTRODUCTION

Some of the objectives of the Forest Insect and Disease Survey are to monitor insect and disease conditions, determine their effect on the forest, and report on the status of the important and most common pests. In the Maritimes, this information is disseminated to interested agencies and individuals through periodical reports such as Seasonal Highlights, Technical Notes, Information Reports, and the Annual Report of the Forest Insect and Disease Survey.

In this report, pest conditions in 1982 are described and, where appropriate, related to provincial forest inventory data; operational control programs against the spruce budworm are summarized; and a list of reports and publications relating to forest-pest conditions is included.

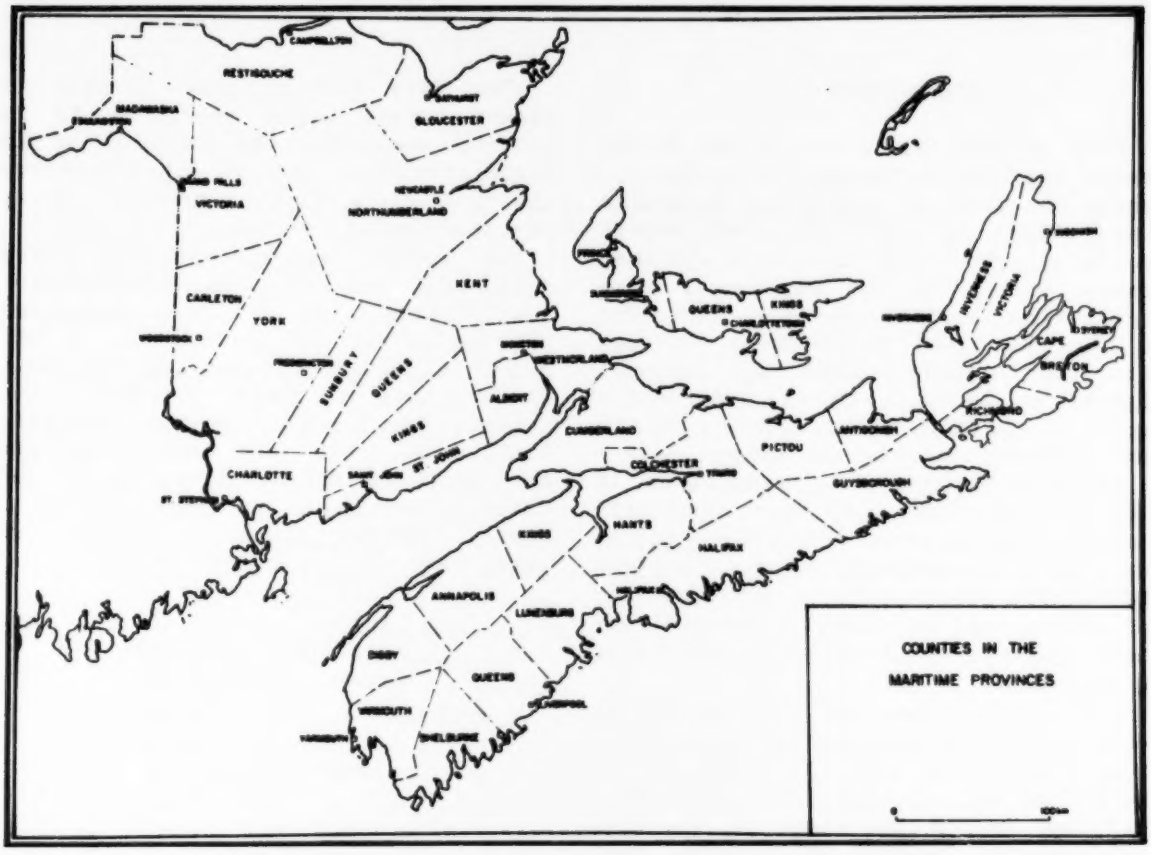
The report aims to provide forest managers with information on pest conditions in the Maritime Provinces, early enough to be considered in management decisions before the start of the 1983 field season. Insects and diseases that were widespread and caused considerable concern in 1982 are discussed in detail, others are presented in tabular form. More information on these and on other specific conditions will be provided upon request from the Maritimes Forest Research Centre.

An innovation in the report this year is the inclusion of a chapter on special surveys. Some of our projects have implication in forest management but did not lend themselves for inclusion in the past. In 1982 we initiated a program of plantation assessments on a systematic basis; white spruce being the first species selected. A study of cone and seed pests of white spruce has also been initiated. Several forest pests, not routinely reported, have received special attention each year but the results of these cyclical reviews received only passing mention, previously. We trust that readers will find this new chapter informative.

Two maps are included to help the reader locate areas mentioned in the report, one shows the counties of the three provinces, and the other indicates the provincial forest services' forest inventory subdivisions.

In recent years, efforts towards collecting and reporting information in quantitative terms have been emphasized, but for a variety of reasons, it will never be possible to express all observations quantitatively. Throughout this report, the terms "severe, moderate, light, and trace" are used to describe the level of defoliation and, in some cases, other injury or insect population levels. Unless otherwise stated, the terms have the following ranges:

Trace	up to 5%
Light	6 - 29%
Moderate	30 - 69%
Severe	70 -100%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CAPE BRETON
CUMBERLAND
PICTOU
ANTIGONISH
RICHMOND
COLCHESTER
GUYSBOROUGH
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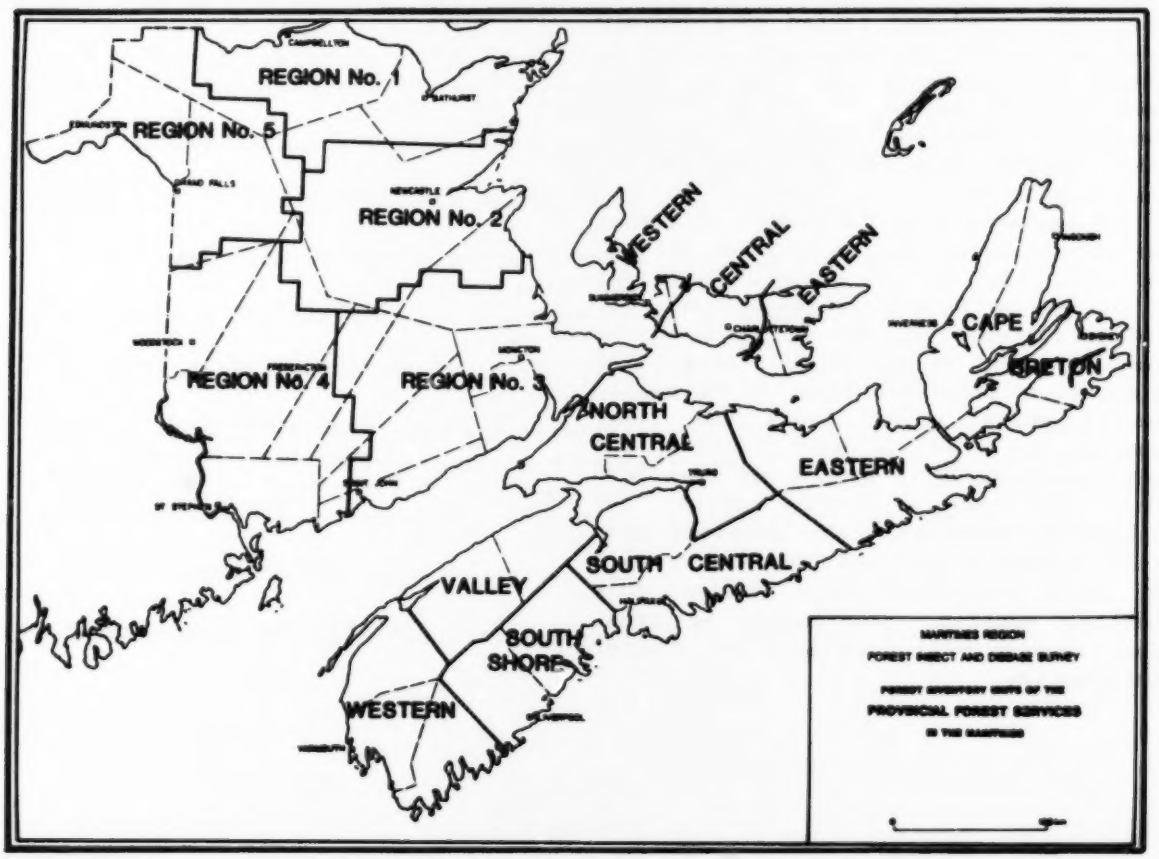
MARITIME PROVINCES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EASTERN
CAPE BRETON
NORTH CENTRAL
EASTERN
SOUTH CENTRAL
VALLEY
SOUTH SHORE
WESTERN

IMPORTANT AND CONSPICUOUS FOREST PESTS

SPRUCE BUDWORM

Information presented on the spruce budworm, Choristoneura fumiferana (Clem.) is summarized from various sources: New Brunswick Department of Natural Resources, (the volume and area data were obtained from "New Brunswick Forest Inventory", 1981 and some of the data used in estimating damage was obtained from "An Assessment of Damage Caused by the Spruce Budworm on Spruce and Balsam Fir Trees in New Brunswick", 1981.) Forest Protection Limited, Nova Scotia Department of Lands and Forests, Prince Edward Island Department of Energy and Forestry, and the Maritimes Forest Research Centre. The degree of damage by the spruce budworm in 1982 in New Brunswick was similar to that in 1981, but was much lower in Nova Scotia and Prince Edward Island.

NEW BRUNSWICK

Defoliation of balsam fir and spruce stands occurred on over 1 387 000 ha in the Province in 1982. Defoliation was severe on 811 000 ha, moderate on 391 000 ha, and light on 185 000 ha (Fig. 1). The area of severe and moderate defoliation (1 202 000 ha) decreased slightly compared with the 1 221 000 ha recorded in 1981.

Damage - An estimated 3.8 million m^3 of balsam fir and 2.0 million m^3 of spruce died in New Brunswick in 1982 as a result of repeated defoliation by the spruce budworm. The loss of about 5.8 million m^3 of wood from the living forest occurred over the almost 5.8 million ha of forest land in the Province with a measurable softwood component.

Due to an unfortunate error on our part in 1981, the spruce budworm caused damage figures were given incorrectly in the Annual Report (Magasi, 1982, M-X-135) for that year and should have been 3.7 million m^3 of balsam fir lost (not 1.4 million m^3), 2.3 million m^3 of spruce lost (not 800 000 m^3), for a total of 6.0 million m^3 (not 2.2 million m^3). We apologize for any inconvenience the error may have caused.

Control operations (large scale) against the spruce budworm in New Brunswick were conducted over 1 724 570 ha in 1982; 1 693 000 ha by Forest Protection Limited and 31 570 ha by Forest Patrol Limited, the latter a subsidiary of a large private forestry company. The chemical fenitrothion with various emulsifiers was used on all but 12 000 ha, at a dosage of 210 g/ha, applied in one or two treatments. Experimental spraying was carried out with Matacil on 8 000 ha and with various commercial formulations of the biocide Bacillus thuringiensis Berliner on 4 000 ha.

Forecast - Egg-mass surveys, conducted in 1982 by Forest Protection Limited, at over 1700 points in the Province, indicate that little change will occur in spruce budworm infestations in 1983 compared with the 1982 populations. Population levels are expected to be high and very high at 45%, moderate at 29%, and low at 26% of the 1753 points assessed. Moderate to severe infestations will be present over most of the forested areas of New Brunswick and substantial areas of susceptible forests will remain in the moderate to high hazard categories.

NOVA SCOTIA

Defoliation of balsam fir and spruce in softwood and mixedwood stands occurred on 211 600 ha in Nova Scotia (Fig. 1). Defoliation was severe on 49 700 ha, moderate on 125 000 ha, and light on 36 900 ha. The 174 700 ha severe and moderate defoliation was less than one-third of the areas so affected in 1981 (567 000 ha).

The infestation in Colchester-Cumberland counties continued and in 1982 constituted the largest outbreak in the Province. Severe and moderate defoliation occurred on 140 900 ha compared with 100 800 ha in 1981. There was a decrease in the area of severe defoliation to 48 900 ha from 69 000 ha in 1981 but the area of moderate defoliation was significantly larger (92 000 ha) than the 31 800 ha in 1981.

On the Northumberland Strait coast

area of Pictou and Antigonish counties severe and moderate defoliation occurred over 29 500 ha, a dramatic increase from the 12 600 ha in 1981. However, over 97% of this defoliation in 1982 was moderate.

In the Annapolis Valley moderate defoliation occurred on 4 100 ha, which accounted for all the defoliation in this area. In 1981 the outbreak affected 136 200 ha of which defoliation on 89 300 ha was severe or moderate.

On Cape Breton Island a further drastic reduction occurred in 1982 in the area affected by defoliation. It was moderate on 400 ha, and light on 12 300 ha; no severe defoliation was observed. In comparison, the 1981 figures were as follows: severe 292 000 ha, moderate 71 400 ha, light 31 800 ha.

Damage - an estimated 3.6 million m^3 of balsam fir and over 700 000 m^3 of spruce died in Nova Scotia in 1982 as a result of repeated defoliation by the spruce budworm. The loss of almost 4.4 million m^3 of wood from the living forest occurred over 1.2 million ha of the Province's 3.4 million ha of forests with a measurable softwood component.

On the Cape Breton Highlands, balsam fir mortality on permanent research plots has increased by a further 11.7% in 1982 and now 66.8% of the standing trees are dead. A further 4.8% have been blown down. The rate of tree mortality has accelerated in spite of the lower spruce budworm populations during the past two years. Armillaria root rot and other secondary organisms are contributing to the demise of the spruce budworm weakened trees. On the Lowlands research plots, balsam fir trees have been dying at a faster rate than on the Highlands and total mortality has surpassed the figures there.

Data from an aerial survey indicate that more than two-thirds of balsam fir and spruce trees were dead or dying in 36% of the stands in western Cape Breton Island. In a further 31% of the stands, from one-third to two-thirds of the coniferous component appeared grey, indicating dead or dying balsam fir and spruce, and in 33% of the stands less than one-third of conifers appeared grey. Damage was most extensive in softwood stands but even in predominantly hardwood stands grey trees were common and in 16% of these more than two-thirds of the conifers were grey. The situation was most serious in the Highlands region of western Cape Breton Island. Details of this survey will be presented at a later date.

Control operations against the spruce budworm were conducted by the Nova Scotia Department of Lands and Forests over 18 914 ha. Target areas were hign value spruce and fir stands of which 18 524 ha were on the mainland and 390 ha on Cape Breton Island. Commerical preparations of the biocide Bacillus thuringiensis Berliner (Thuricide 16B, Dipel 88 and Thuricide 32LV), were used at the recommended concentration of 20 BIU/ha. All areas were treated once, with the exception of 240 ha on Cape Breton Island, which received two applications.

Forecast - Egg mass surveys indicate a resurgence of infestations in all four main outbreak areas and more defoliation is expected in 1983. Weather conditions were favorable for spruce budworm survival, an abundant crop of nutritious balsam fir and spruce flowers were available, and in Cape Breton Island there was evidence of a moth invasion. As a result, in 1983 defoliation is expected to be more extensive and more severe than in 1982 in the three mainland outbreak areas and in several isolated areas in western Cape Breton Island.

PRINCE EDWARD ISLAND

Defoliation of balsam fir and spruce stands was severe on 10 400 ha, moderate on 2 700 ha and light on 2 200 ha. The 13 100 ha of moderate and severe defoliation (Fig. 1) is more than a ten-fold decrease from the 133 000 ha so affected in 1981 and only a little over half of the 22 000 ha in those categories in 1980. More than half of the severe defoliation (6 500 ha) occurred in the western part of the Province. The actual defoliation was less than predicted

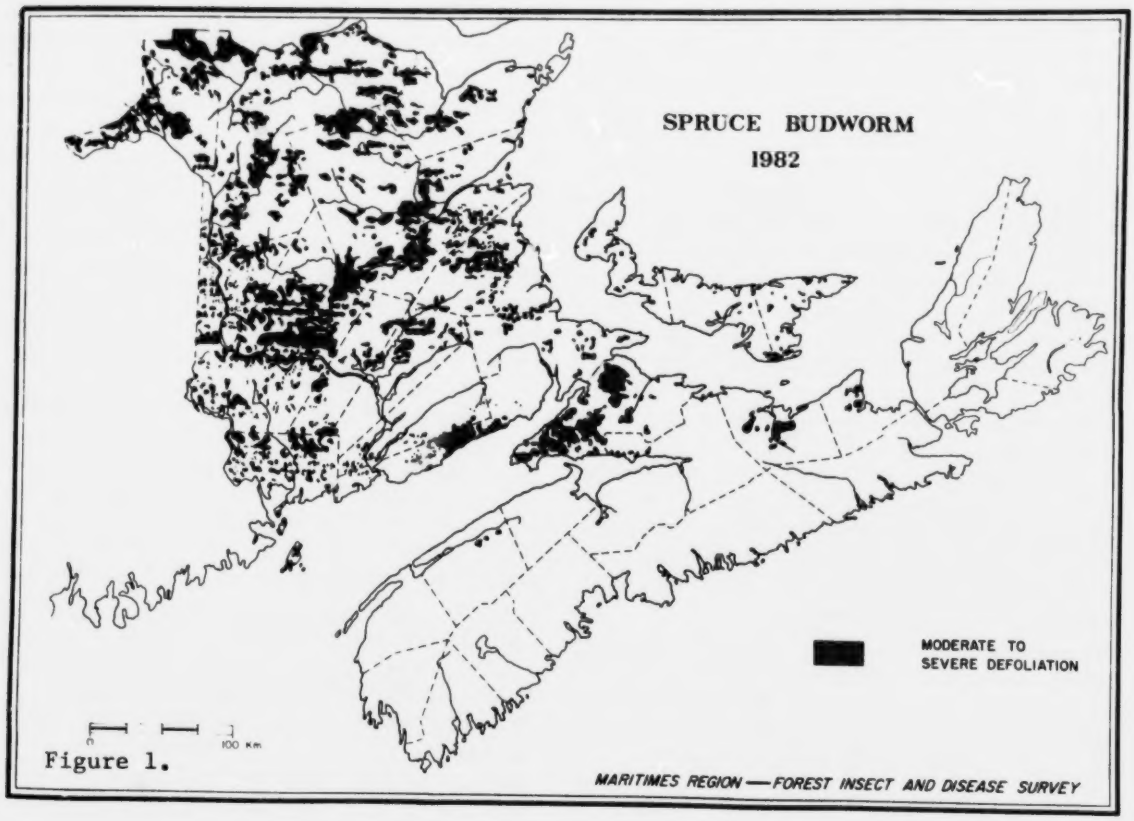

Figure 1.

based on egg-mass surveys conducted in 1981.

Damage - Mortality of both balsam fir and spruce occurred throughout the Province where repeated defoliation in previous years had weakened trees. No mortality figures are available, however, the area within which trees are dead or dying from spruce budworm is estimated at 30 000 ha.

Control - No control measures on an operational scale were carried out against the spruce budworm in Prince Edward Island.

Forecast - Egg-mass surveys indicate infestation levels in 1983 to be slightly reduced in eastern, increased in central, and about the same in western Prince Edward Island as in 1982.

SPRUCE BUD MOTH

Spruce bud moth, Zeiraphera canadensis Mutuura & Freeman, caused considerable defoliation and shoot distortion in white spruce plantations, especially in northwestern New Brunswick, in 1980 and 1981. Because of the potential importance of this insect in reforestation programs, it received much attention on several fronts.

In 1982, the insect was widespread in white spruce stands throughout the Maritimes (Fig. 2). A survey of 181 locations found it present in 73% of the areas in New Brunswick, 77% in Nova Scotia, and 52% in Prince Edward Island. The intensity of infestations varied greatly but was generally highest in northwestern New Brunswick and in northern Prince Edward Island. In the Black Brook area of Victoria County, N.B. more than half of the current shoots were damaged in white spruce plantations and some individual trees suffered more than 90% shoot damage.

The Forest Pest Management Institute has initiated a study on the biology of spruce bud moth with the objective of finding effective control methods by discovering the most susceptible stages in the insect's life cycle.

A control program was conducted on 11 000 ha of spruce bud moth infested white spruce plantations. Fenitrothion was applied in two treatments at 210 g/ha concentration by Forest Patrol Limited over J.D. Irving Ltd. holdings.

A study on the biological control of spruce bud moth with imported parasites has been initiated by the Forest Insect and Disease Survey.

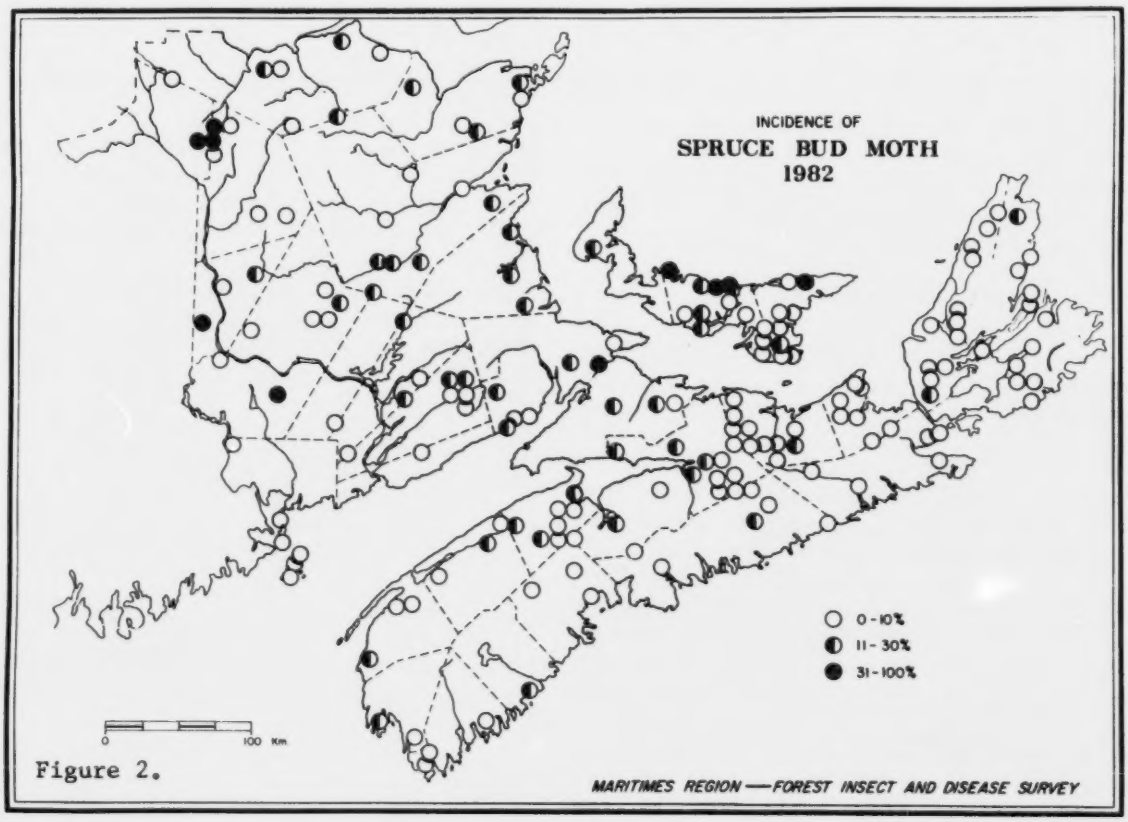

Figure 2.

SPRUCE BEETLE

Spruce beetle, Dendroctonus rufipennis (Kby.), attacks continued throughout the Region in 1982. Mortality of white spruce and to a much lesser degree of red and black spruce, intensified. The increased mortality was particularly noticeable on Cape Breton Island in Nova Scotia and in central and western Queen County in Prince Edward Island.

In Nova Scotia, an estimated 3% of the white spruce died in 1982 representing 584 000 m^3 of merchantable wood. Most of the loss, 408 000 m^3, occurred on Cape Breton where 21% of white spruce has been killed by the spruce beetle during the present infestation.

In Prince Edward Island, spruce mortality has increased by at least 5% in 1982, representing over 200 000 m^3 of merchantable wood, and now an estimated 30% of the merchantable spruce is dead in that Province.

In New Brunswick, the small outbreaks reported in 1981 remained active at Sackville, Westmorland County and on Grand Manan Island, where there are at least four pockets of infestation. Infested white spruce trees were found for the first time in a small area in Fundy National Park.

EASTERN LARCH BEETLE

Eastern larch beetle, Dendroctonus simplex Lec., normally attacks only weakened, damaged, or recently felled host material. However, when populations are very high, living, apparently healthy, mature or overmature trees, and even younger small diameter trees can also become infested.

A population build-up was first observed in the Maritimes in Nova Scotia in 1976. This increase in beetle populations followed several years of severe defoliation of larch by the larch sawfly, Pristiphora erichsonii (Htg.). Since then the beetle has become widespread in all three provinces and has caused serious tree mortality. By the end of 1981, 24% of merchantable-size larch was dead in New Brunswick, 64% in Nova Scotia, and 13% in Prince Edward Island.

In 1982, new attacks by the insect appeared to be lower than in previous years in all three Maritime provinces. Current tree mortality does not necessarily reflect this observation as trees that died this year may have been attacked during previous seasons.

A study, started in early May to elucidate the biology and behavior of the insect, found beetles excavating galleries one week after exposure of freshly cut larch bolts. The female enters first and is found at the distal end of the gallery with the male closely behind. Egg deposition commenced during the second week. By the third week an average of 56 gallery systems/0.3-m bolt, 99 egg niches/bolt, 2 niches/gallery, and 1-2 eggs/niche were counted. Larvae were present during the fourth week with gallery construction up to 13 mm long. Pupation started during the eighth week, few parent adults remained, and the length of larval galleries was up to 38 mm. By the ninth week all eggs had hatched, larval gallery elongation had ceased, and larvae were enlarging the distal end of the galleries. Callow adults began to turn black (a sign of maturation) during the 12th week, the majority becoming black by the 14th week. Emergence of the brood commenced during the 15th week.

EUROPEAN LARCH CANKER

The European larch canker, caused by the fungus Lachnellula willkommii (Hartig) Dennis, was first discovered in the Maritimes in 1980, and during surveys in 1981 to establish its distribution was found widespread on native larch (tamarack) in southeastern New Brunswick and at five locations in Nova Scotia. In 1982, surveys, concentrated in Nova Scotia and Prince Edward Island and in areas of New Brunswick outside the known range of the disease, found the fungus in most areas of mainland Nova Scotia, and the range was extended somewhat in northeastern New Brunswick (Fig. 3). No infection was found in Prince Edward Island, on Cape Breton Island, or in the northern part of New Brunswick. To date only native larch has been affected.

European larch canker has been a serious disease in many parts of Europe. The fungus is considered, by most, to be a primary pathogen and its presence in Europe has resulted in the exclusion of larch from plantation programs. In North America, the fungus was found in Massachusetts in the 1920s in European larch plantations. Periodic concentrated eradication attempts appear to have been successful as the disease was not found in 1965 during the most recent survey of the area. However, it was found in northeastern Maine in 1981.

The fungus infects mostly young trees, therefore, future wood supplies will be affected. Tree mortality reduces stocking, branch mortality reduces growth, and cankers reduce wood quality. The extent to which the disease will cause damage in the Maritimes is not yet known but the potential for damage is there and the role of the disease will have to be considered in view of increased emphasis on forest renewal and larch tree improvement programs.

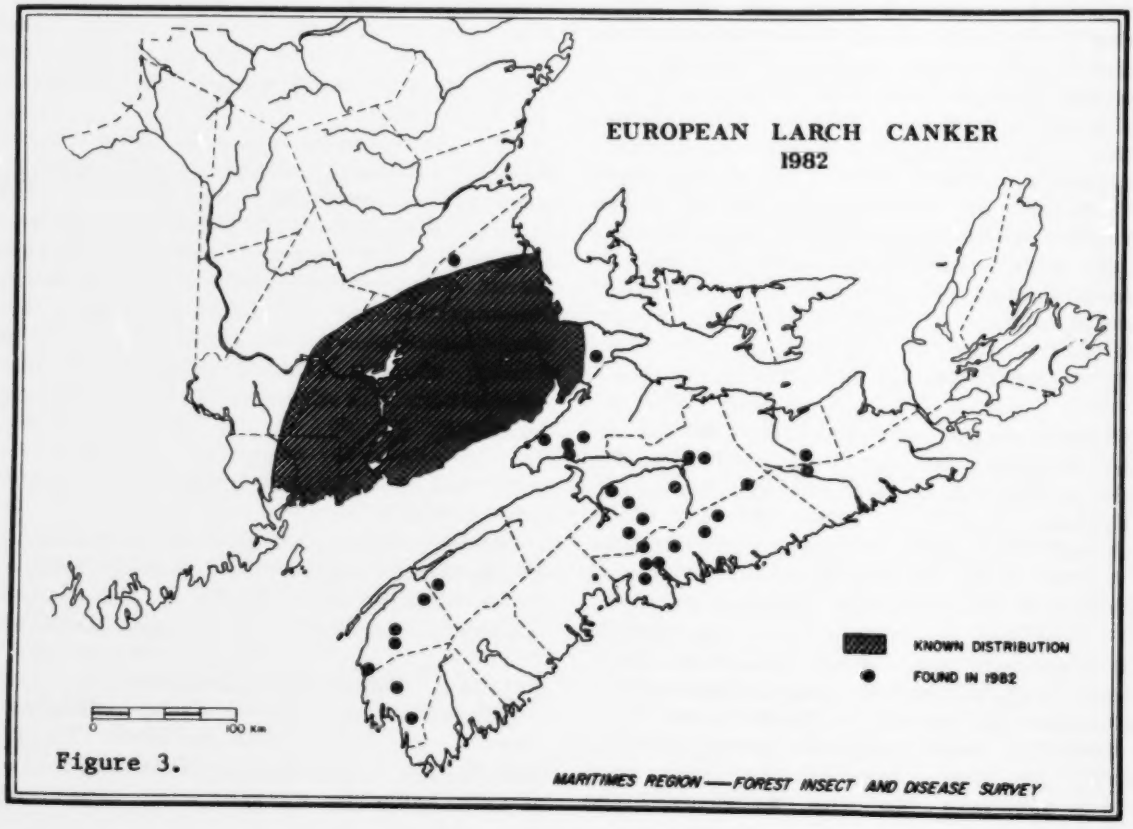

Figure 3.

SCLERODERRIS CANKER

Scleroderris canker, caused by the fungus Gremmeniella abietina (Lagerb.) Morelet, was first found in the Maritimes Region in 1971. The disease is widespread in New Brunswick, especially in the northern half of the Province and infects mostly plantations of jack, red, and Scots pine. In Nova Scotia, where the disease was first found in 1972, a few plantations of red, jack, and Scots pine suffered limited lower branch mortality during the mid-1970s. The disease was last found in that Province in 1978, and appears to have died out. It has never been found in Prince Edward Island.

The European race of the disease, which is capable of killing trees of any size (the North American race kills only small trees), and several other "intermediate" races have been found in New Brunswick since 1978; however, symptoms and damage expression are indistinguishable. Plantations infected by these races have either been removed or are under close surveillance for changes in symptom expression.

In 1982, the symptoms of the disease - discolored foliage and dead branches - were more common than during the past two seasons but were found only in areas already known to harbor the fungus. Study areas have been established to determine the rate of spread in infected plantations.

SHOOT BLIGHT OF CONIFERS

Shoot blight of conifers, caused by the fungus Sirococcus strobilinus Preuss, has been known in the Maritimes for less than a decade but has been present for much longer. The fungus infects and kills newly developed shoots, fruits on the twigs, needles, and cone scales from whence the spores are dispersed and cause new infections. Heavy attacks cause branch mortality, which result in crown dieback and tree mortality. Hosts include pine, spruce, larch, hemlock, Douglas fir, and true firs, although in the Maritimes the disease affects mostly red pine and occasionally spruce. Trees of any size, from seedlings to mature trees 15 m in height, are damaged or killed.

The disease is present in all three provinces, most widely distributed in red pine plantations in Nova Scotia. The damage potential of the disease is indicated from the following observations made in 1982.

In Nova Scotia, at Douglas Road, Annapolis County, 49% of the trees were dead, 43% lost more than half of their crown, and 8% had less than 50% crown mortality; in a young plantation, just north of the Shelburne-Yarmouth county line, 13% of the trees were dead and 80% of the trees sustained some branch mortality; at Squid Cove, Lunenburg County, 16% of the trees were dead, 40% had more than half of the crown dead, and 44% suffered 0-50% crown mortality; at Debert, Colchester County, in a 10-ha plantation (which was not destroyed as reported in 1981), 90% of the trees suffered 0-25% shoot damage, on 8% of the trees 25-50% of the shoots were dead, and on 2% of the trees more than half of the shoots died. There was no tree mortality.

In New Brunswick, at Shin Creek, Sunbury County, mature trees had an average of 5-10 red shoots in a 10-ha area; at McDougall Brook, Sunbury County, 5-70% of the shoots were infected in a natural stand of about 10 ha; at McDougall Lake, Charlotte County, 80% of about 100 open grown trees had 10-70% of their shoots damaged and some small regeneration showed 90% branch mortality.

SPIDER MITES

Spider mites are generally thought to be pests of ornamental conifers or to cause damage in high value plantations. However, considerable foliage discoloration occurred both in plantations and in natural stands of various coniferous hosts in New Brunswick in 1982 as a result of population build-up by Oligonychus ununguis (Jacobi) and Eurytetranychus n. sp.

Spider mites have reached extremely high populations throughout New Brunswick and caused needle discoloration of spruce, often followed by needle shedding. The survival of several consecutive generations of the pest was probably aided by the dry weather during the summer.

Discoloration was severe in plantations and in natural stands over extended areas in the southern and mid-central parts of the Province, while in the northern parts discoloration was less intense. Discoloration was characteristically patchy, from groups of a few trees to continuous areas of about 50 ha in southern York County. In high infestation areas, the majority of the needles turned red on trees of all age classes, often all needles were discolored on individual trees. In infestations of lower intensity, discoloration progressed from the stem outward, the older needles being first affected. The loss of foliage is likely to stress the trees and in extreme cases tree mortality could occur.

No significant needle discoloration was observed in Nova Scotia or in Prince Edward Island.

The role of spruce spider mite, O. ununguis, which in the past was thought to be the major organism involved in this type of foliage discoloration is now in question. Damage caused by the spruce spider mite and the newly found undescribed species of spider mite are indistinguishable. It is most unlikely that Eurytetranychus n. sp. is new to the Region. In the past, all spider mite damage was attributed to O. ununguis, although now it seems obvious that at least two species of mites are implicated. Consequently, the situation needs reevaluation and past reports regarding spruce spider mite damage should be considered in light of this new knowledge.

STILLWELL'S SYNDROME
(Sudden death of balsam fir trees)

Balsam fir trees, usually with a fair complement of foliage despite having been exposed to varying amounts of defoliation by the spruce budworm for several years, turned bright red and died. This phenomenon has been known in balsam fir stands where considerable damage or mortality has occurred. The "dropping out" of surviving trees in spruce budworm damaged stands during the apparent recovery stage, even years after the collapse of the outbreak, was noted by the late M.A. Stillwell during his pathological studies in the Green River Watershed of New Brunswick, his native province. In his honor, we propose to refer to this phenomenon as Stillwell's Syndrome.

In New Brunswick, sudden death of balsam fir trees was reported in 1980 and 1981, from various parts of the Province. In 1982, an unusually high number of balsam fir trees died in this manner. Stillwell's Syndrome was first noticed in late May and continued through the summer 1982. This type of mortality occurred throughout the Province but was most prevalent in western and southern New Brunswick from Victoria County to Charlotte County and eastward to Westmorland County. Trees died singly or in groups and in some stands as many as 30% of the trees died in patches of various sizes. The largest continuous area affected was found in the northern part of central New Brunswick in the Serpentine Lake - Trousers Lake region of Victoria and Northumberland counties, where previous balsam fir mortality was 31%. A further 13% of the trees died here as a result of Stillwell's Syndrome on over 5000 ha in 1982.

In Nova Scotia, balsam fir trees died of Stillwell's Syndrome on the west coast of Cape Breton Island along about 5-10 km of road between Cregnish to Margaree and in the Cape Breton Highlands National Park. Red trees were also found in a few locations in Cumberland County.

Investigations in 1982 into the possible cause of Stillwell's Syndrome in two areas of New Brunswick found that all red trees sampled were affected by the shoestring root rot, Armillaria mellea (Vahl ex Fr.) Kummer, and at

least one species of beetle. Balsam bark weevil, Pissodes dubius Rand., was present in 75% of the affected trees, balsam fir bark beetle, Pityokteines sparsus (Lec.), in 17%, and sawyer beetle, Monochamus sp. in 17%. However, observations elsewhere in recent years indicate that not all Stillwell's Syndrome killed trees are affected by shoestring root rot; balsam bark weevil and balsam fir bark beetle frequently occur together on the same tree; and sawyer beetle attack of weakened living trees is not uncommon.

GYPSY MOTH

The gypsy moth, Lymantria dispar (L.), is the most destructive insect of hardwoods and to a lesser degree of conifers in the northeastern United States. Severe defoliation by the insect in the United States covered over 5 million ha in 1981 and about 3.2 million ha in 1982. The insect has been present in Maine for many years but the populations have expanded northward close to the international border only during the past decade.

In the Maritime Provinces a few egg masses and pupal remnants were found at a few locations in 1981, the first time in almost half a century, raising the possibility of gypsy moth becoming a pest in this Region.

In 1982, a committee was formed and all surveys were coordinated in an effort to utilize available manpower more effectively in combatting this latest threat to the forests of the Region. Organizations involved in surveys in 1982 included the Forest Insect and Disease Survey of the Canadian Forestry Service, the Plant Health and Inspection Branch of Agriculture Canada, New Brunswick Department of Natural Resources, New Brunswick Department of Agriculture, Nova Scotia Department of Lands and Forests, Nova Scotia Department of Agriculture, and Prince Edward Island Department of Energy and Forestry. The New Brunswick Department of Environment was involved in discussions on control.

In New Brunswick, larvae of the gypsy moth were found in the Mohannes area, southwest of St. Stephen, Charlotte County, in an oak stand, adjacent to the St. Croix River across from Woodland, Maine. Larval numbers were low except in a small area close to the river. The infestation covered an area along the St. Croix River about 3 km long and extending for about 500 m eastwards. Although defoliation was much in evidence, most of it was attributed to feeding by the forest tent caterpillar. Elsewhere, one larva was found at Oak Hill, Charlotte County, about 20 km north of the infestation area and another at Digdeguash, Charlotte County, about 34 km east of Mohannes. Thus, the southwestern part of New Brunswick is considered to harbor a very low gypsy moth population, at present confined almost exclusively to oak, its favorite food.

In Nova Scotia, a few egg masses were found in 1981 at Yarmouth. The Town, in cooperation with the Nova Scotia Department of Lands and Forests, has treated an area of a few city blocks with the biological insecticide Bacillus thuringiensis Berliner and implanted shade trees with ACE caps (orthene). No gypsy moth larvae were detected during subsequent surveys although unconfirmed reports suggested their presence.

An adult gypsy moth male pheromone trapping program has been conducted annually since 1969, when the insect was becoming a problem in neighboring Maine. Male moths have been trapped each year and generally in increasing numbers. Adult trapping is aimed at defining areas where searching for egg masses should be concentrated. Unfortunately, in the Maritimes, catch results are confounded by the fact that great numbers of male moths (females are flightless) are brought in by weather fronts from infested areas in the United States.

In 1982, over 1300 pheromone traps were placed in the Maritimes. The results are summarized in Fig. 4. This year regular, daily observation, and late placement-traps were used in an

attempt to separate invaders from local moths to refine plans for more efficient egg mass surveys.

Egg masses and other life stages, were found in both New Brunswick and Nova Scotia. The results of the surveys are summarized in Table 1 and Fig. 5. The areas indicated must be considered prime trouble spots for 1983.

Table 1: Results of gypsy moth egg mass surveys in the Maritimes in the fall of 1982

Location		Description
New Brunswick		
Charlotte County	- Mohannes area	Numerous egg masses in the general area of the 1982 infestation
	- St. George	Two egg masses on oak tree within the town
	- Campobello Island	One poorly formed egg mass on willow adjacent to Roosevelt Park
St. John County	- Saint John	One unemerged female pupa in Rockwood Park
Nova Scotia		
Yarmouth County	- Yarmouth	More than 50 egg masses in several separated areas within the town
Digby County	- Grosses Coques	Thirteen egg masses, 19 female pupal cases, 9 male pupal cases on hawthorn bushes and ornamental poplar trees on one property. This area has been referred to as Church Point in previous reports but is 2.5 km northeast of that community
	- Smith's Cove	One egg mass and female pupal case on birch at Fundy View Campgrounds
Annapolis County	- Clementsport	One egg mass and female pupal case on hawthorne, 0.4 km east of Cornwallis Naval Reserve base
	- Paradise	Six egg masses on 25 trees examined in abandoned apple orchard

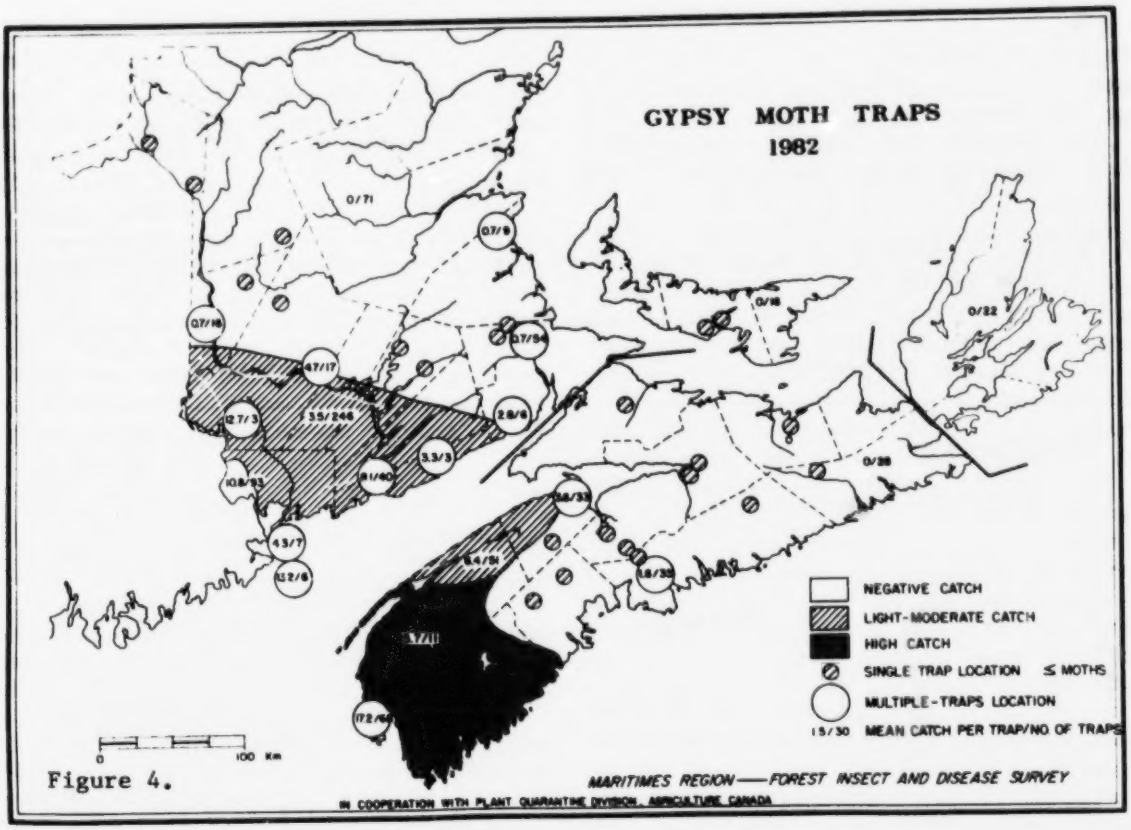

Figure 4.

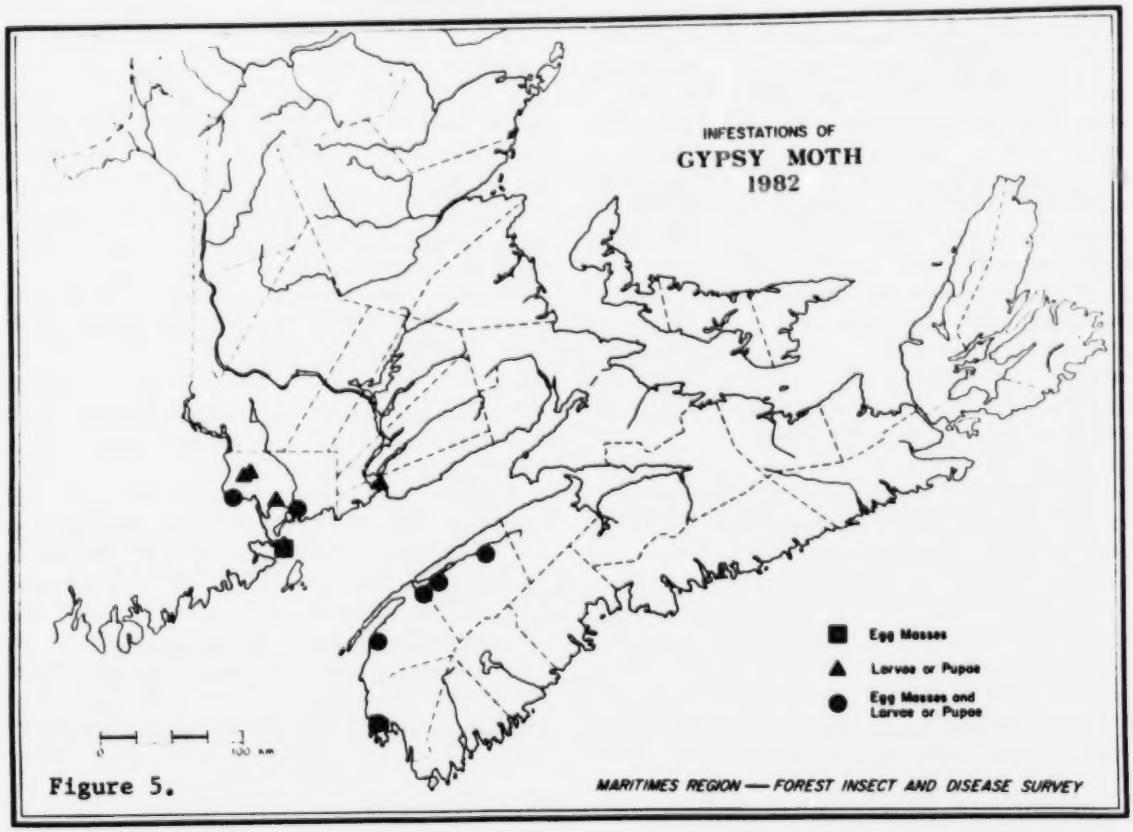

Figure 5.

FOREST TENT CATERPILLAR

The forest tent caterpillar, Malacosoma disstria Hbn., was the major hardwood defoliator in the Region in 1982. The outbreak areas expanded both in New Brunswick and in Prince Edward Island and the insect has caused measurable defoliation in Nova Scotia as the population build-up continued.

The insect feeds on a wide variety of hardwood trees with preference for trembling aspen, oak, apple, birch, and cherry. When populations are high and larvae migrate in search of food, other tree species such as maple, ash, alder, elm, and ground vegetation are also readily defoliated. Feeding also occurs on some conifers, notably larch and white spruce.

Forest tent caterpillar, often and erroneously referred to as the armyworm, has become a well known - and much hated - insect in residential and recreational areas in New Brunswick in recent years. The invasion has been fought with conventional as well as with some rather unorthodox control "techniques", the severity of these often proportional to the degree of unease the appearance of the hordes of caterpillars had caused.

In New Brunswick, the area of severe defoliation has almost doubled over the previous year and in 1982 covered 1 389 000 ha (Table 2). The outbreak area however has "shifted" southward and severe defoliation occurred along the St. John River Valley south of Woodstock and in a broad zone in southern New Brunswick eastward to Newcastle (Fig. 6).

The two species of poplar webworms, Tetralopha aplastella (Hlts.) and Meroptera pravella (Grt.), were present again throughout the outbreak area, occupying over 90% of the pupation sites of the forest tent caterpillar on trees in many places and feeding on leaves which replaced those removed during the early summer defoliation. This second, although only partial, defoliation of trembling aspen trees in the same year subjects trees to additional stress.

Repeated defoliation resulted in some twig and branch dieback as the only visible damage, to date, in the oldest parts of the outbreak. The decreased insect populations in the northern St. John River Valley should lessen stress on the trees and be a welcome break for residents of the area.

In Prince Edward Island, a forest tent caterpillar outbreak has persisted in Prince County since 1973, in spite of high levels of disease and parasites in the population. At its peak in 1975, defoliation, mostly of the trembling aspen, occurred on more than 28 200 ha. Since then, 5 000 to 7 000 ha were defoliated each year but the affected patches changed within the infestation area. In 1981, the outbreak was 13 800 ha, and in 1982 it expanded to 18 800 ha. Defoliation was severe on 11 000 ha and moderate on 7 800 ha. Defoliation of sugar maple and apple trees occurred east of the outbreak area in a few isolated locations.

In Nova Scotia, the population build-up reported in 1981 continued in 1982. The isolated "pockets" have grown both in numbers and size, mostly in Annapolis, Kings and Hants counties, but also occurred in most other areas of the mainland. The total area of severe defoliation was 4 700 ha. Poplar leafrollers caused additional leaf browning in a few areas.

Table 2. Forest tent caterpillar outbreak in New Brunswick (1978 - 1982)

Year	Area of severe/moderate defoliation (ha)
1978	few small patches
1979	37 000
1980	177 000
1981	775 000
1982	1 389 000

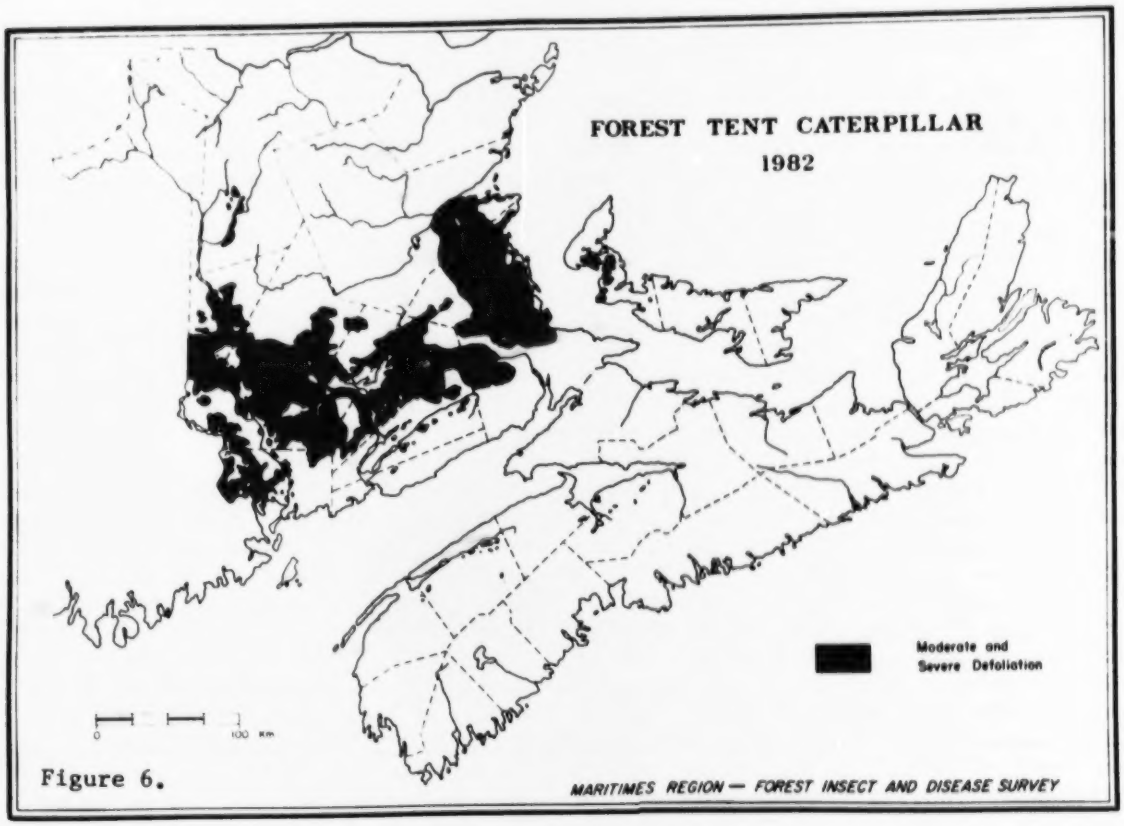

Figure 6.

DUTCH ELM DISEASE

Dutch elm disease, caused by the fungus Ceratocystis ulmi (Buism.) C. Moreau, continued to intensify within its known range and to spread into new areas in 1982 (Fig. 7).

In Nova Scotia, the most extensive spread occurred in Antigonish County where the disease was first found in 1981. The outbreak in Pictou County spread further southward, in the Annapolis Valley the disease has reached Bridgetown. The first infected elm tree was discovered in Halifax and the disease entered the town of Truro.

In Prince Edward Island, the disease reappeared after a two-year absence in Prince County where the Provincial Government carried out a sanitation cut in 1979, after the discovery of the first infected trees. An elm tree was found infected in the Tyne valley in 1982.

In New Brunswick, "gap filling" further refined and extended the known range. The presence of the disease has now been confirmed in most areas where elm occurs.

A special assessment was conducted in 1982 to determine the status of Dutch elm disease in Canada. The results in the Maritimes show that within the known range of the disease, 73% of the elms are either dead or dying in New Brunswick and 17% are so affected in Nova Scotia. In New Brunswick 37% of the living elm population is infested (and dying), in Nova Scotia 7% of the living elm population is so affected. However, in Nova Scotia, with a shorter history of the disease, which is still actively spreading, losses are more variable among infected areas. Losses in the Cumberland County outbreak are comparable to those in New Brunswick (Fig. 8).

The incidence of the disease in the 42 populated areas (cities, towns,

villages) surveyed was so variable that no meaningful summary figures could be obtained. In general, the incidence in an urban area was lower than in the surrounding rural setting, and depended largely on the effort expended to control the disease in the community.

The future is not encouraging. Regeneration, trees less than 2 m in height, has been found infected in eight of nine areas surveyed. The one healthy "juvenile tree" stand, is at the edge of the Pictou County, N.S. outbreak where, to date, less than one-third of the large trees are affected. In the infected areas, an average of 45% of the juvenile trees were dead or dying.

In Fredericton, N.B., where the progress of the disease and the effect of the control program have been monitored since 1961, when the disease was first found in the City, there was a further reduction in the annual loss in 1982. The 105 elm trees lost to the disease represented 3.0% of the current population within the Dutch Elm Disease Management Area. This is lower than the 5.3% lost in 1981 and a significant decrease from the loss of 7.8% in 1980. Losses to date amount to 25.0% of the original urban elm stand.

Surveys conducted for elm bark beetles, carriers of Dutch elm disease, found the following.

The native elm bark beetle, Hylurgopinus rufipes (Eich.), was present throughout the Maritimes. The beetle index, based on the number of potentially overwintering adults per unit area of the trap, was generally low and comparable to values in the Fredericton area, where beetle numbers have been monitored since the mid-1970s. In New Brunswick, populations were highest in the area surrounding Fredericton (by as much as 40 times that of values obtained in the City), and in the vicinity of St. Stephen, Charlotte County. In Nova Scotia, the highest number of beetles captured was in northeastern Annapolis County but the index was only one-tenth as high as the index in central New Brunswick.

The smaller European elm bark beetle, Scolytus multistriatus (Marsh.), an important carrier of Dutch elm disease in the United States, and increasing in importance in parts of southern Ontario, was found in pheromone traps for the first time at St. Andrews, Charlotte County and just south of Fredericton in New Brunswick. No beetles were captured in either Nova Scotia, where this species has never been found, or in Prince Edward Island, where one beetle was found in Prince County in 1981.

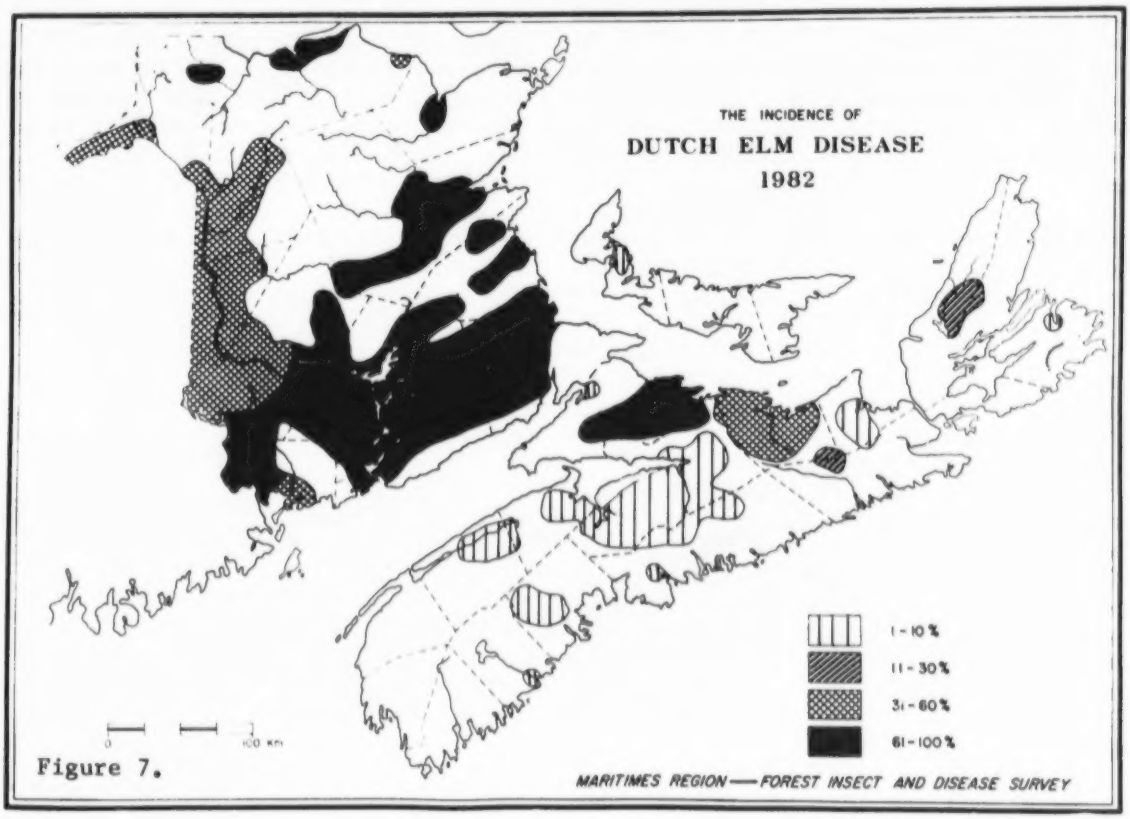
THE INCIDENCE OF
DUTCH ELM DISEASE
1982
1 - 10 %
11 - 30 %
31 - 60 %
61 - 100 %
0
100 km
MARITIMES REGION — FOREST INSECT AND DISEASE SURVEY

Figure 7.

SUGAR MAPLE BORER

The sugar maple borer, Glycobius speciosus (Say), infests the trunk and larger branches of sugar maple trees. The larva feeds on the inner bark and sapwood, constructing a long gallery that runs parallel with or, at times, cuts across the grain. The bark dies over the gallery creating ugly scars. Trees are always injured by attack and three or four larvae can kill a tree. The adult is a large black and yellow beetle. Although the insect is common in the northeastern United States, there have been very few records of its presence in the Maritimes Region. Because of concern expressed by maple syrup producers, a survey was undertaken in 1982 to determine the distribution and the damage caused by the sugar maple borer. Surveys are not yet complete but results to date indicate that the insect is widespread in southern New Brunswick, common in Nova Scotia, and present in Prince Edward Island (Fig. 9). No infested trees have been found in northern New Brunswick.

Damaged trees were found in sugar bushes as well as in non-syrup production areas. The appearance of the scars clearly indicates that the insect has been present in the Maritimes for some time and the lack of information, to date, was the result of lack of attention to the problem.

In southern New Brunswick, 12 of 17 sugar maple areas examined were infested by the insect and on average, 20% of the trees were damaged in infested stands.

Although sugar maple makes up a substantial portion of the hardwood component in all three Maritime provinces, the real impact of the sugar maple borer may be in reducing maple syrup production in commercial operations.

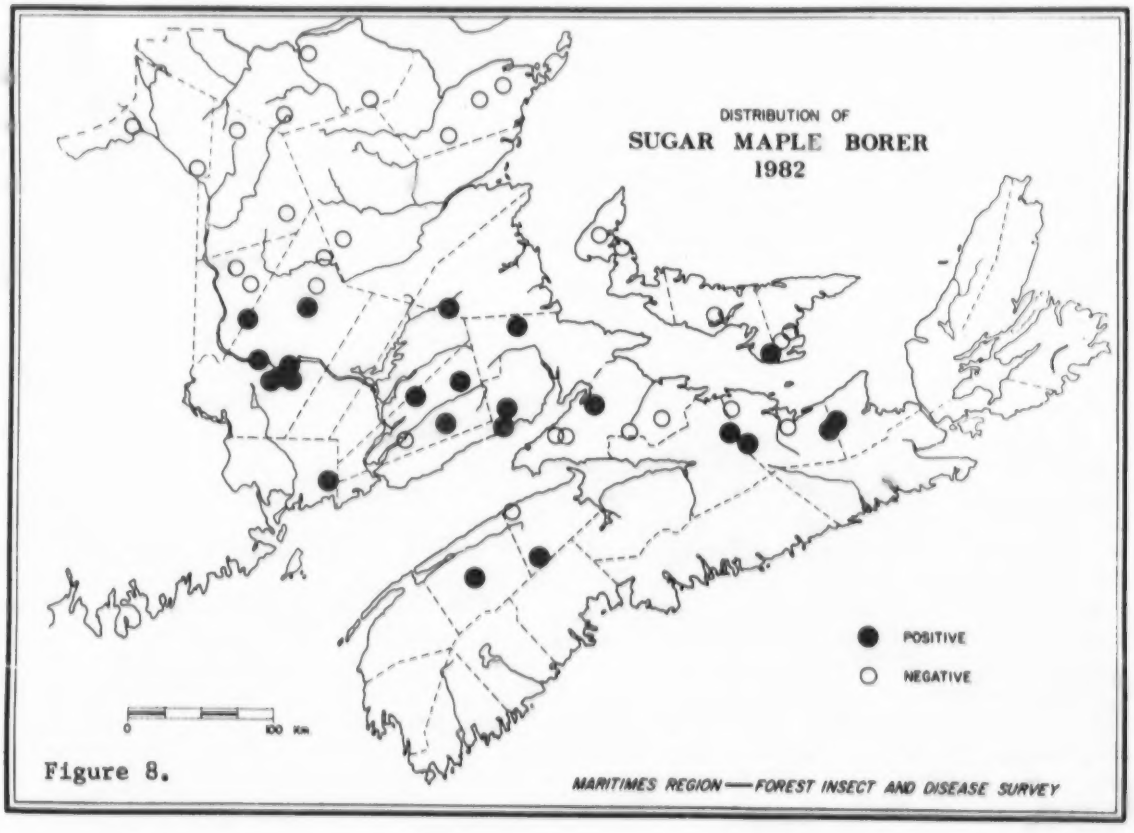

Figure 8.

DETERIORATION OF BIRCH

Early foliage browning and premature leaf drop of white birch occurred between 1979 and 1981 in southern New Brunswick along the Bay of Fundy. The only organism consistently identified was the leaf spot fungus Septoria sp. but we felt that its presence alone did not account for the condition. The bronze birch borer, Agrilus anxius Gory, has been active in the area and was implicated in the death of a great number of trees. However, the cause and effect relationships have not been determined as to what factors weakened the trees making them prone to borer attack. Abiotic conditions have been suspected but their role has not been elucidated.

In 1982, systematic sampling was conducted in 13 areas to determine changes in the chemical composition of foliage and soil throughout the season. The analysis is not yet complete, however, in 1982 there was a dramatic improvement in the condition of birch. The severe or moderate leaf discoloration of the past three years did not materialize and, although leaf browning occurred in essentially the same areas, its intensity was much lower. The leaf fungus Septoria sp. was present in all 13 areas and, based on examination of leaf samples submitted for laboratory analysis, accounted for most of the leaf browning sustained by the trees.

OAK DEFOLIATORS

Oak leaf shredder, Croesia semipurpurana (Kft.), and the oak leafroller, Pseudexentera cressoniana Clem. have been causing defoliation of oak since the early 1970s and have been the most serious pests of oak in the Maritimes. In New Brunswick the current widespread forest tent caterpillar outbreak has overshadowed any potential defoliation by these insects.

In Nova Scotia, the oak leafroller was present throughout much of the Province. The most severe leaf rolling occurred in Queens, central Annapolis and parts of Shelburne counties where the population of red oak is highest in the Province. The oak leaf shredder, a defoliating insect which until a few years ago constituted the greater portion of the complex, was present throughout, but in much lower numbers and caused less problem than the roller. Repeated foliage damage since the 1970s has resulted in varying degrees of twig, branch, and crown dieback in most of the affected areas of the Province.

In southern New Brunswick, any defoliation or leaf rolling which may have occurred as the result of high populations of these insects was masked by the severe defoliation caused by the forest tent caterpillar. At Cranberry Lake, Queens County, where repeated defoliation has seriously damaged trees during the past seasons, the oak leaf shredder far outnumbered the oak leafroller, a reverse of the general situation in Nova Scotia.

In Prince Edward Island, the oak leaf shredder caused moderate defoliation at several locations in Queens County in the same general areas as in 1981.

SPECIAL SURVEYS

SPECIAL SURVEYS

Several forestry projects are carried out each year that are not necessarily related to one of the forest pests of "major importance". In the past information from these projects has either been reported elsewhere or used internally. Considering the implications this information may have in forest management, it will be summarized and the results of special surveys will constitute a new chapter in this and future annual reports.

FOREST PEST ASSESSMENT IN PLANTATIONS

The increasing importance of planted trees in forest management has resulted in the initiation of an annual plantation assessment program. The lessons learned from agriculture and from experience with large-scale forest plantings suggest that tracts of even-aged, single species forests will bring with them special forest pest problems. Previously insignificant pests may take on new importance and many of the well known pests may change their habits in the new environment. As our knowledge of pest outbreaks in plantations accumulates, our methods of establishing and tending them must incorporate ways to offset the effects of such pests if we wish to avoid or minimize losses.

Our plantation surveys will attempt to determine the status of all significant insects and diseases. At least one host species will be assessed each year in selected plantations throughout the Maritimes to obtain a general picture of pest problems. This should indicate if there is a need for detailed surveys of all plantations in that specified area to be carried out in cooperation with clients.

PLANTATION SURVEY OF WHITE SPRUCE

White spruce plantations were assessed in 1982. The 17 plantations surveyed were well distributed in the Region. In a few cases where plantations of the desired size and age were not available, old field regeneration of comparable age was substituted and the results were assumed to be representative of pest problems.

The spruce bud moth, Zeiraphera canadensis, was present in 16 of the 17 plantations examined, and affected a greater number of shoots than any other pest: 15% in New Brunswick; 6.8% in Nova Scotia; and 3.5% in Prince Edward Island.

The spruce budworm, Choristoneura fumiferana, was the next most common pest, in terms of infestation level. In New Brunswick, all 7 plantations were infested by budworm; in two of them, more than 25% of new shoots were affected. In Nova Scotia, budworm infestation levels were low, only 4 of 8 plantations were affected and in these, populations were trace. In Prince Edward Island, budworm infestation levels were low.

The effects of these two insects on the trees are difficult to separate. More than 10% shoot defoliation occurred in only two plantations in New Brunswick, in the areas with the largest budworm populations. One of these also had the highest bud moth population of all sites.

In general, much higher numbers of bud moth than of spruce budworm are required to do the same degree of damage. In this survey, infestations of spruce bud moth of less than 25% of shoots attacked did not result in more than light defoliation.

Among other pests encountered, the spruce bud midge, Rhabdophaga swainei Felt, was found in 13 of the 17 plantations but no more than 4% of shoots were attacked at any one location. The mean number of shoots attacked in New Brunswick was less than 1% and in Prince Edward Island was 2%. By killing buds, the spruce bud midge often causes bud proliferation in young trees, thus affecting the future shape of the tree.

The eastern spruce gall adelgid, Adelges abietis L., was found in 13 of 17 plantations. Infestation rate was less than 1% of shoots affected, except

for two New Brunswick areas where 3% of the shoots were affected and one in Nova Scotia with a 10% infestation.

The spruce twig aphid, Mindarus obliquus (Cholod), was found in six plantations, always at trace level of infestation.

Other insect pests noted were the spruce needle miners, white pine weevil, spider mites, spruce coneworm, and aphids.

Only two diseases were detected, a spruce needle cast and a needle rust. The needle rust was found at four locations, two in Nova Scotia, where shoot infection rates were 17 and 10%, and one each in New Brunswick and Prince Edward Island, where less than 1% of the shoots were affected. The needle cast was found at one location. It affected 13% of the shoots in one of the plantations in Nova Scotia where needle rust was also present.

Frost damage was noted in 10 plantations, but was significant at only one location where 19% of the shoots were damaged.

The general conclusion is that white spruce plantations were in relatively good shape in 1982. However, the potential for damage by any of these pests is present, especially by the two principal pests found.

CONE AND SEED INSECTS AND DISEASES OF WHITE SPRUCE

Plantation programs, through nursery operations, depend on seed production. Any interference with this will affect future wood supplies. Damage by insects and diseases is an important factor in reducing potential seed crops.

Because the cone production in 1982 was expected to be heavy on white spruce in New Brunswick and Nova Scotia, a project was initiated to assess damage caused by insects and diseases.

During 1982 a total of 26 samples of flowers, conelets, and cones from two locations in New Brunswick and from three in Nova Scotia was collected for identification of organisms and analysis of damage. Neither the rearing program nor the analysis of data is yet complete. However, a preliminary list of insects encountered in white spruce cones includes, in decreasing order of possible impact: spruce budworm, Choristoneura fumiferana; spruce cone maggot, Hylemya anthracina (Czerny); spruce coneworm, Dioryctria reniculelloides Mut. & Mun.; spruce gall chalcid, Megastigmus atedius atedius Wlk.; spruce cone gall midge, Dasineura canadensis Felt; and a number of resin midges, probably of little importance.

The number of viable, uninjured seeds was determined for each cone through dissection and the results are shown in Table 3.

Pathogenic fungi found on the cones were the spruce cone rust, Chrysomyxa pirolata Wint., and the needle rust Pucciniastrum americanum (Farl.) Arth. present on a few cones at Kerry Brook, Albert County, New Brunswick.

The study will continue in 1983.

Table 3. The percentage of seed loss in white spruce cones resulting from insect damage in the Maritimes, 1982

Location	Avg. number of viable uninjured seeds per cone	Seed loss* %
Acadia Forest Experiment Station, Sunbury Co., N.B.	1.7	98.2
Kerry Brook, Albert Co., N.B.	19.4	78.9
Camden, Colchester Co., N.S.	14.6	84.1
Upper Mount Thom, Pictou Co., N.S.	8.1	91.2
Wentworth, Cumberland Co., N.S.	25.8	72.0

*Based on potential average of 92 viable seeds per cone (Fowells, H.A. 1965. Silvics of Forest Trees of the United States. USDA Agric. Handb. No. 271).

CYCLICAL PEST REVIEWS

Many pests, although omnipresent in the forest, are not reported annually because (1) there is little fluctuation in their distribution or in the damage caused by them, (2) they normally cause so little damage that regular surveys cannot be justified, or (3) they are present in such small numbers that they are easily overlooked during routine assessment surveys. However, these organisms are a part of the pest component in the forest and, although separately each may cause little damage, their combined effect can weaken the trees, reduce growth or expose them to other problems. Forestry practices are changing and some organisms, until now obscure and unimportant in their natural habitat, are changing in importance and the damage caused by them is becoming significant.

Several of these "other" insects and diseases are reviewed each year in the Maritimes, often in connection with surveys involving a specific host species. The number depends on other activities, which determine the time available and the time required for specific survey techniques. The results provide an assessment of the current status of the organism and a benchmark to which past and future assessments are compared.

LARCH SHOOT MOTH, Argyresthia laricella Kft., attacks new shoots of both native and exotic species of larch and the affected twigs die by the following spring. The insect is considered of perennial occurrence but of minor impact. However, larch has recently gained in popularity as a forest species. The establishment of plantations could create an environment that is different from the insect's natural habitat, and change its population dynamics. In seed orchards of high value, or in plantations of genetically improved stock, the tolerance towards even minor pests is likely to be different from what is now acceptable in natural stands.

The status of larch shoot moth was assessed in 74 larch stands in the Region. The results are summarized in Table 4. The insect was widespread in all three provinces but only in New Brunswick did the infestation rate exceed 1% of shoots infested at any location. The highest infestation was found at Prince of Wales, St. John County, where 2.7% of the shoots were affected.

SPRUCE GALL MIDGE, Mayetiola piceae Felt, has caused serious shoot damage in two small white spruce plantations in New Brunswick in recent years. This type of damage, however, is infrequent and the pest is considered of minor importance.

Assessment surveys in 1982 found spruce gall midge only at 2 of 35 locations in New Brunswick, 2 of 27 locations in Nova Scotia, and at none of 10 locations in Prince Edward Island. White spruce plantations were involved at all four affected locations; the two in New Brunswick are the same as those where damage was previously reported.

Table 4. The status of larch shoot moth in the Maritime Provinces in 1982.

Province	No. of stands examined	Percent of stands with	
		Insect present	Infestation more than 1% of shoots
New Brunswick	34	91	15
Nova Scotia	34	47	0
Prince Edward Island	6	17	0

ACKNOWLEDGEMENTS

This report is the result of the combined effort of all members of the Forest Insect and Disease Survey: C.L. Burlock, L.J. Coady, C.M. Dobson, K.J. Harrison, J.E. Hurley, A.M. Jones, C.D. MacCall, A.W. MacKay, L.P. Magasi, O.A. Meikle, W.R. Newell, D.P. Ostaff, B.A. Pendrel and F.A. Titus. We wish to thank our summer students and the numerous staff members who contributed in many ways, especially E.G. Kettela, I.C. Millar, D.B. Marks and T.R. Renault.

Much of the information on the status and control of the spruce budworm in New Brunswick is based on data from Forest Protection Ltd., Fredericton, N.B. The Nova Scotia budworm control information is based on Department of Lands and Forest data.

Information contributed by the Pest Detection Officers of the New Brunswick Department of Natural Resources, the Nova Scotia Department of Lands and Forests and the Prince Edward Island Department of Energy and Forestry is acknowledged and appreciated. Special thanks go to those who participated in the gypsy moth surveys.

Parks Canada, the Department of Natural Resources of New Brunswick, the Department of Lands and Forests of Nova Scotia and private individuals operated light traps during the summer months.

The contribution and cooperation of private citizens and of personnel at all levels of industrial organizations are noted with thanks. Their effort on our behalf in so many ways not only makes our work easier but also makes us a more effective unit.

We wish happy retirement to Don Elgee, our colleague for many years, who, this summer, traded in his microscope for a fishing rod.

LIST OF PUBLICATIONS

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*Kettela, E.G. 1982. 1982 results of aerial surveys for current spruce budworm defoliation in New Brunswick and a review of the methodology. MFRC Technical Note No. 66.

*Kettela, E.G. 1982. Spruce budworm infestations on Prince Edward Island in 1982 and a forecast for 1983. MFRC Technical Note No. 67.

*Kettela, E.G. 1982. Status of the spruce budworm infestations in the Maritime Provinces - 1982. MFRC Technical Note No. 68.

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OTHER INSECTS AND DISEASES

OTHER INSECTS AND DISEASES

This table lists, alphabetically by common name, most insects and diseases encountered in the Maritimes in 1982 not discussed in detail. Inclusion in the table does not imply that the organism is necessarily of lesser economic importance than those discussed in the text. It may be that an organism, e.g., whitemarked tussock moth, is at an ebb of biological activity and did not cause enough concern in 1982 to warrant detailed discussion. It may be that although "severe", an organism, e.g., Douglas fir needle blight, was only of localized importance in 1982.

INSECT OR DISEASE	HOST(S)	LOCALITY	REMARKS
Alder flea beetle *Altica ambiens alni* Harr.	Alder	Region	In Nova Scotia, leaf browning increased in extent and intensity with pockets of moderate and severe browning throughout the mainland. In Prince Edward Island, the area was reduced from last year and severe browning was restricted to small areas at 48 Roads and New Perth, Kings County. In New Brunswick, severe browning occurred from Little Ridge to St. Stephen, Oak Bay to St. George, and on Deer Island, Charlotte County.
Ambermarked birch leafminer *Profenusa thompsoni* (Konow)	White birch Wire birch	N.B.	Severe browning of white birch foliage occurred again this year in the Jardine Brook area, Victoria County, where all the leaves of many trees were mined. In the Nictau Lake area, Restigouche County, light and moderate browning occurred on a few white birch. This insect in combination with much higher populations of the birch leafminer *Fenusa pusilla* (Lep.) caused severe browning of wire birch foliage in Kouchibouguac National Park, Kent County, New Brunswick. In Nova Scotia populations were low and damage negligible. The insect was not collected in Prince Edward Island.
Animal damage	Conifers Hardwoods	Region	*Mice* damaged trees in a 6-yr-old Scots pine plantation in Prince Edward Island for the second consecutive year and tree mortality has reached 90%. *Porcupine* damaged 25% of young spruce and fir trees along the Shepody Road, Albert County, girdled 10% of roadside balsam fir trees in Fundy National Park in New Brunswick. Girdling of small groups of various trees was observed elsewhere throughout the Province. In Nova Scotia, a small group of Austrian pine trees was heavily damaged in Pictou County.

			Rabbits and mice girdled roadside bushes of various species in many areas of New Brunswick in York, Carleton, Northumberland, Sunbury, Queens, Kings, Victoria, and Restigouche counties. Woodpecker damage was noted on various hosts in Charlotte, York, Victoria, and Madawaska counties, New Brunswick. Squirrels caused flagging on jack pine, 2-3 flags/tree, in the process of cone removal, at scattered locations in Gloucester County, eastern and northeastern Northumberland County, central and western Kent County, and at Pine Glen, Albert County, New Brunswick.
Anthracnose of maple Kabatiella apocrypta (Ell. & Ev.) Arx	Sugar maple Red maple	N.B.	Light browning was observed on a few red and sugar maple in Restigouche County and on a few red maple in Northumberland County. Limited aerial surveys over the area where severe foliage browning occurred in Victoria County in 1981 did not reveal any recurrence.
Armillaria root rot Armillaria mellea (Vahl ex Fr.) Kummer	Balsam fir Red pine Black spruce White spruce Tamarack	N.B. N.S.	The disease continued to cause mortality. It was strongly associated with attacks by spruce budworm, sawyer beetles, bark beetles, weevils, blowdown, site disruption and perhaps some planting procedures. The fungus is omnipresent in forest soils needing only the right conditions for infection. In New Brunswick, scattered dead trees were found in natural stands in many parts of the Province, and in plantations in eastern Madawaska and northern Victoria counties. In Nova Scotia, infected dead and dying trees were commonly found in the budworm devastated forests of Cape Breton Island. Elsewhere in the Province, about 2% mortality of balsam fir occurred in Christmas tree plantations at Rissers Beach and Gold River, Lunenburg County.
Ash rust Puccinia sparganioides Ell. & Barth.	White ash	N.S.	Infections continued to cause moderate twig and branch mortality of ornamental trees at Lunenburg, Lunenburg County and Shelburne, Shelburne County. Elsewhere, light leaf browning was noted at West River, River John, and Alma, Pictou County.

INSECT OR DISEASE	HOST(S)	LOCALITY	REMARKS
Aspen leafrollers *Badebecia urticana* Hbn. *Choristoneura conflicta* (Wlk.) *Choristoneura rosaceana* (Harr.) *Pseudexentera oregonana* Wlshm. *Sciaphila duplex* Wlshm.	Trembling aspen	Region	Leafrolling by a complex of species was once again common throughout much of the Region but of lesser intensity than in 1981. In New Brunswick, leafrolling reached a high of 90% at Lake George, York County, and averaged 18% at 17 widely scattered locations. In many places, defoliation of trembling aspen by forest tent caterpillar overwhelmed other competing species.
Balsam gall midge *Paradiplosis tumifex* Gagné	Balsam fir	Region	The loss of current needles caused by this insect is of importance to the Christmas tree industry. Populations are cyclical and presently in an upward trend. In New Brunswick, the gall midge was recorded in all counties except Victoria and Madawaska but was heaviest in the south-central and northeastern parts of the Province. Population levels showed considerable variation, the highest recorded was at Lake George, York County with 75% of the needles affected. In some locations, Christmas trees were downgraded or cutting postponed as a result of damage sustained. In Nova Scotia, this insect was recorded from more locations than in 1981 but populations were low except in Christmas tree plantations at Burke Lake, Queens County where damage was moderate and severe. In Prince Edward Island, light damage occurred on young balsam fir at scattered locations in Queens and Prince counties.
Balsam fir aphid *Cinara* sp.	Balsam fir	N.S. P.E.I.	In Nova Scotia, high populations occurred on a few trees in Christmas tree plantations in Queens, Lunenburg, Colchester, Kings, Halifax, Pictou, and Guysborough counties and on young natural growing trees in Inverness and Richmond counties. In Prince Edward Island, this insect was found on a few young trees in Queens and Kings counties.
Balsam twig aphid *Mindarus abietinus* Koch.	Balsam fir	Region	Populations remained generally low throughout the Region but were more widespread than in 1981. In New Brunswick, a severe infestation occurred in a small area near Lake Stream, and on Christmas trees at St. Charles, Kent County, where up to 30% of new shoots were infested. In

			Nova Scotia, moderate damage occurred on a few trees in Christmas tree plantations in Halifax and Lunenburg counties and in natural regeneration at scattered locations in Guysborough, Inverness, and Pictou counties.
Birch ambrosia beetle *Trypodendron betulae* Sw.	Birch	Region	Found at scattered locations at various levels of intensity, often in association with the bronze birch borer, where birch trees are in a state of decline.
Birch casebearer *Coleophora serratella* (L.)	White birch Alder	Region	Populations remained low throughout New Brunswick except in a few scattered stand of white birch in Westmorland, Kent, Northumberland, Sunbury, and Charlotte counties where light and moderate browning occurred. Trace to light browning of white birch and occasionally alder throughout Nova Scotia except near Oxford and Amherst, Cumberland County where pockets of trees sustained moderate and severe leaf injury. In Prince Edward Island, infestations continued to be widespread but were less severe than in 1981. Moderate or severe browning occurred in patches in south Kings, southeast and northeast Queens, and southeast and north Prince counties.
Birch leafminer *Fenusa pusilla* (Lep.)	Wire birch White birch	Region	Varying degrees of browning of wire birch and to a lesser extent white birch were again common throughout New Brunswick. In Nova Scotia, browning of wire birch foliage was moderate or severe in patches throughout Lunenburg, Annapolis, Kings, Hants, and Queens counties and generally light elsewhere in the Province. In Prince Edward Island, populations were higher than in previous years, with moderate and severe browning of wire and, to a lesser degree, white birch at scattered locations in west Kings, east Queens, and central Prince counties.
Bronze birch borer *Agrilus anxius* Gory	White birch	Region	Birch trees stressed by site disruption, air pollution, chronic attacks of defoliating or leafmining insects, and age, become susceptible to attack by secondary insects such as the bronze birch borer. In New Brunswick, attack was most intense in the southern part of the Province where counts at seven locations averaged 23% infestation. In Prince Edward Island, almost all trees in a small area at Rustico Island were dead, 22% of the trees in an adjacent stand were infested. The borer was present in 45% of the trees at Bonshaw, Queens County. In Nova Scotia, populations remained low.

INSECT OR DISEASE	HOST(S)	LOCALITY	REMARKS
Bruce spanworm *Operophtera bruceata* (Hulst)	Beech Sugar maple Trembling aspen	N.B.	Populations generally low. Moderate and severe defoliation of understory sugar maple with a trace in overstory near St. Leonard, Madawaska County. Indications are that populations are increasing in the northern part of the Province.
Cedar leafminers *Argyresthia aureoargentella* Brower *Argyresthia freyella* Wlshm. *Argyresthia thuiella* (Pack.) *Pulicalvaria thujaella* (Kft.)	Cedar	Region	In Prince Edward Island, populations persisted in the Muddy Creek, Sandy Park, and Miscouche areas of Prince County, heavy branch and some tree mortality have resulted from several years of attack. Moderate foliage damage in small groups of trees was recorded for the first time at Freeland. In Nova Scotia, severe browning of ornamental trees at New Glasgow, Pictou, and Stellarton, Pictou County and Truro, Colchester County. In New Brunswick, trace and light browning occurred at locations in York, Kings, and Charlotte counties.
Cherry blight	Pin cherry	N.S. P.E.I.	Various levels of damage at many locations in western and a few scattered points in eastern Nova Scotia. Common but light damage in Prince Edward Island except moderate at isolated locations in Prince and Queens counties.
Cherry casebearer *Coleophora pruniella* Clem.	Trembling aspen	P.E.I.	Populations continued to decline with small areas, less than 1 ha, of light or moderate browning at a few locations in Kings and Queens counties.
Douglas fir needle blight *Rhabdocline* sp. and Douglas fir needle cast *Phaeocryptopus gaeumannii* (Rohde) Petr.	Douglas fir	N.B. N.S.	Needle loss resulting in thin crowns occurred in plantations at Watson Settlement and Giberson Settlement, Carleton County, Kilburn, Victoria County, Moores Mills and St. Davids Ridge, Charlotte County, Monument Settlement, York County, St. Francois, Madawaska County in New Brunswick. The first record of this disease in Nova Scotia at Barss Corner, Lunenburg County, where it caused severe reddening and needle drop of most Douglas fir trees in a 1.2-ha Christmas tree plantation.
Eastern spruce gall adelgid *Adelges abietis* (L.)	White spruce	Region	This insect is distributed throughout the Region, populations are generally low in Nova Scotia and Prince

			Edward Island. In New Brunswick, counts at 10 scattered locations indicate an average infestation level of 24%. (See also: Plantation survey of white spruce.)
Eastern tent caterpillar *Malacosoma americanum* (F.)	Cherry Apple Birch	Region	This insect continues to be common in New Brunswick. Nests were most common in the southern half of the Province particularly in the central and southwestern parts. In northern New Brunswick nests were observed at scattered locations in Madawaska, Restigouche, and Gloucester counties. Nests present in several locations in Nova Scotia but most numerous in parts of Lunenburg, Queens, and Annapolis counties. In Prince Edward Island, a few nests were observed at York and Crapaud, Queens County.
Elm leafminer *Fenusa ulmi* Sund.	English elm	Region	In Nova Scotia, intensity of attack declined at some locations but moderate or severe browning was sustained at others, up to 10% branch mortality occurred at Stellarton, Pictou County. Severe browning of exotic elm foliage was found again this year at Charlottetown, Queens County, Murray River and Montague, Kings County, Richmond and Summerside, Prince County, Prince Edward Island. In New Brunswick, severe browning occurred at several locations in Westmorland County and at St. Andrews, Charlotte County.
European pine sawfly *Neodiprion sertifer* (Geoff.)	Red pine Scots pine	N.B. N.S.	First record for New Brunswick where it was found on ornamental pines at Saint John, St. John County. In Nova Scotia, light and moderate defoliation of ornamental Scots pine trees at Bible Hill, Colchester County, and trace defoliation of red pine at Oxford Junction, Cumberland County, McLellan Brook and Coromonie, Pictou County.
European pine shoot moth *Rhyacionia buoliana* (Schiff.)	Scots pine Red pine	N.S. P.E.I.	Following a year of low populations brought about by high overwintering larval mortality, numbers were again rising in both provinces. In Nova Scotia, increases occurred in a red pine Christmas tree plantation in northwest Lunenburg County; in Prince Edward Island, the number of attacked shoots in Scots pine plantations increased to about 35% at Park Corner, and to about 10% at Marshfield, Queens County.

INSECT OR DISEASE	HOST(S)	LOCALITY	REMARKS
Fall cankerworm *Alsophila pometaria* (Harr.)	Apple Elm Plum Red maple Red oak Trembling aspen White birch	Region	This insect was present at various locations scattered throughout New Brunswick. It was of minor importance except at Fredericton, York County where defoliation was moderate in parts of the City. In Nova Scotia, low populations were present in parts of Annapolis, Colchester, Kings, and Yarmouth counties where it was found in association with the winter moth. In Prince Edward Island, defoliation was light and moderate on apple trees at Cavendish and light on a few elm trees at Charlottetown, Queens County.
Frost damage	Balsam fir Spruce Hardwoods	N.B. N.S.	Late spring frost affected new shoots of spruce, balsam fir, and to a much lesser extent hardwoods, in the northern two-thirds of New Brunswick. White spruce was severely affected in plantations along Rte. 17 in Victoria County, on open growing spruce from east of Jardine Brook to St. Quentin, Kedgwick to Minneval and Kedgwick to Kedgwick River, Restigouche County, where up to 95% of the new growth was killed. In Nova Scotia, current shoots of balsam fir regeneration suffered light damage at scattered locations throughout much of the Province. Some hardwoods, particularly sugar maple, were damaged at two locations in Antigonish and Inverness counties.
Globose gall rust *Endocronartium harknessii* (J.P. Moore) Y. Hiratsuka	Jack pine Scots pine	N.B. P.E.I.	Infections were widespread in jack and Scots pine plantations, in natural jack pine stands and on ornamental trees in eastern New Brunswick from Bathurst to Moncton; many trees in a Scots pine Christmas tree plantation at Upper Blackville, Northumberland County had 50 to 100 galls. In Prince Edward Island, galls were present on about 3% of Scots pine in a plantation less than a hectare in size with an average of 14 galls per tree at Park Corner, Queens County. Galls were also detected at Woodbrook, Prince County.
Hemlock looper *Lambdina fiscellaria fiscellaria* (Guen.)	Conifers	Region	Population remained low throughout the Region.

Ink spot of aspen *Ciborinia whetzelii* (Seaver) Seaver	Trembling aspen	N.B. P.E.I.	Present at widely scattered locations throughout much of New Brunswick, from single trees to small patches and at various levels of intensity from a few leaves to nearly 90% foliage browning at km 30, Plaster Rock-Renous Highway, Victoria County; in Prince Edward Island, light discoloration at Baldwin Road, Kings County, and DeBlois, Prince County.
Jack pine budworm *Choristoneura pinus pinus* Free.	Jack pine	N.B.	The area of moderate and light defoliation in some central and northeastern areas reported in 1981 was not as pronounced this year. Larvae were still common in the Tracadie Artillery Range and other localities in Gloucester and Northumberland counties. At Red Pine, Gloucester County up to 90% of the flowers were infested. Trace or light defoliation occurred in Kent, Queens, and Westmorland counties.
Larch casebearer *Coleophora laricella* (Hbn.)	Tamarack	Region	Present at scattered locations throughout the Region but generally at low levels.
Larch sawfly *Pristiphora erichsonii* (Htg.)	Tamarack	Region	Populations of this important defoliator of larch continued to be very low.
Leaf and twig blight of aspen *Venturia macularis* (Fr.) E. Muell. & Arx	Trembling aspen	Region	Much reduced in severity from 1981 but still widespread throughout the Region.
Leaf blotch of horse-chestnut *Guignardia aesculi* (Pk.) V.B. Stew.	Horse-chestnut	Region	This disease was moderate on ornamental trees on Deer Island, New Brunswick. In Nova Scotia, discoloration was severe at South Milford, Annapolis County, Port Williams, Kings County, and Sherbrooke, Guysborough County, moderate at a few points in Pictou, Guysborough, Inverness, Cumberland, and Victoria counties. In Prince Edward Island, light or moderate foliage browning was found wherever the host tree grows.
Leaf spot of maple *Phyllosticta minima* (Berk. & Curt.) Underw. & Earle	Red maple Sugar maple	Region	In New Brunswick, spotting was common but light on red maple in Charlotte County, and on sugar maple in Kings County; present throughout much of Nova Scotia and found at two locations in Prince Edward Island, at light levels of intensity.

INSECT OR DISEASE	HOST(S)	LOCALITY	REMARKS
Maple leafroller *Cenopis acerivorana* MacK.	Red maple Sugar maple	N.B. N.S.	This insect was found at many locations throughout New Brunswick. At 21 randomly selected locations leaf rolling on red maple averaged 7.6%. In Nova Scotia, leafrolling of red and sugar maple was moderate on 18 965 ha, and light on 1764 ha on Cape Breton Island.
Mountain-ash sawfly *Pristiphora geniculata* (Htg.)	Mountain-ash	Region	Populations continued at about the same level as last year, individual and groups of trees were defoliated to various degrees, at points scattered throughout the Region.
Needle rust *Chrysomyxa ledicola* Lagh.	White spruce	N.S.	Caused severe discoloration of new needles on individual and groups of young open growing trees over several hectares near St. Esprit, Richmond County.
Needle rust *Coleosporum asterum* (Diet.) Syd.	Jack pine Red pine	N.B. N.S.	Present in most jack pine plantations in south-central New Brunswick at various levels of intensity but was particularly damaging in the Hector Brook area of Queens County where severely attacked trees are showing evidence of decline; at Big Forks, Kent County, 95% of the trees were affected. In Nova Scotia, up to 90% of jack pine needles were infected in plantations from Harrison Settlement through Chignecto Game Sanctuary to East Apple River, Cumberland County, and about 40% of old red pine needles on a few trees in a 3-ha plantation at Lorne, Pictou County.
Needle rust *Pucciniastrum* sp.	Balsam fir	N.B. N.S.	The moderate and severe needle yellowing reported in 1981 in Fundy National Park, Albert County, New Brunswick was reduced this year to light. In Nova Scotia, very light needle discoloration of regeneration occurred at locations scattered throughout the Province.
Pine tortoise scale *Toumeyella parvicornis* (Ckll.)	Jack pine	N.B.	The infection at Despres Lake, Northumberland County collapsed and the trees show evidence of recovery.

Poplar leaffolding sawfly *Phyllocolpa* sp.	Trembling aspen	Region	In New Brunswick, light leaf folding occurred at widely separated locations in Kings, York, Gloucester, and Northumberland counties. Populations were low in Nova Scotia but were recorded throughout Kings, Colchester, Cumberland, Annapolis, and Hants counties. In Prince Edward Island, populations were generally low except at Riverdale, Queens County, where moderate leaf folding was present on many aspen trees.
Poplar leafmining sawfly *Messa populifoliella* (Town.)	Balsam poplar Carolina poplar Lombardy poplar Trembling aspen	N.B.	This insect, primarily a problem of ornamental poplars, was once again common throughout the Province. Moderate browning occurred in the Fredericton-Oromocto area where moderate and severe was reported previously. Over 50% of the foliage was affected at Sunnyside, Restigouche County, Taylor Brook west of Allardville, Gloucester County, Canoose Lake, Charlotte County, Thomaston Corner, York County, Jardine Brook and Licford, Victoria County.
Poplar serpentine leafminer *Phyllocnistis populiella* (Chamb.)	Trembling aspen	N.B.	The infestation reported in 1981 in northern and central New Brunswick continued; it was less intense in the northern part of the Province but increased in the central and southern parts. In the Stanley area, York County, and the Boiestown area, Northumberland County severe mining was common.
Red pine sawfly *Neodiprion nanulus nanulus* Schedl	Red pine Austrian pine	N.S.	The infestation at Mt. William, Pictou County, subsided in 1982, and only a trace of defoliation occurred; elsewhere in the Province trace defoliation occurred in a 3-ha red pine plantation in Pictou County and on a few Austrian pine in Colchester County.
Roadside salt damage	Conifers	N.B. N.S.	Foliage reddening of varying degrees of roadside conifers, particularly white pine, was common throughout the two provinces.
Root collar weevils *Hylobius* sp.	Red pine Scots pine	N.S. P.E.I.	In Nova Scotia, about 10% of Scots pine was dead or dying in a plantation at Port Hood, Inverness County and less than 5% in a plantation at Cloverdale, Antigonish County. In Prince Edward Island, the infestation in a red pine plantation at Brookvale, Queens County continued, but no additional tree mortality occurred in 1982.

INSECT OR DISEASE	HOST(S)	LOCALITY	REMARKS
Saddled prominent *Heterocampa guttivitta* (Wlk.)	Sugar maple	Region	Populations of this destructive defoliator remained at the endemic level, except for a 60-ha area on which light to moderate defoliation occurred near North Kemptville, Yarmouth County, Nova Scotia.
Satin moth *Leucoma salicis* (L.)	Silver poplar Carolina poplar Balsam poplar Lombardy poplar	Region	This insect, primarily a pest of ornamental poplars, particularly silver poplar, was found throughout the Region, at various levels of intensity. Near Shediac Westmorland County, New Brunswick about 1500 ha of trembling aspen in a forest stand suffered 50% skeletonizing by early instar larvae, in late August and early September. This could indicate defoliation in 1983.
Sawyer beetles *Monochamus* sp.	Balsam fir	N.B.	Red flagging, the result of adult feeding on the bark of twigs was common at Fairfield, St. John County with 1-5 dead branch tips on about 30% of trees; along Rapids Depot Road, Restigouche County trees averaged 3-5 flags.
Snow and ice damage	Jack pine	N.B.	Accumulations of snow and ice on jack pine caused considerable damage in plantations at several locations in Kings, Queens, Kent, Sunbury, Albert, and Gloucester counties; 6% of the leaders were broken or killed, 10% of the trees suffered severe, and 24% light or moderate damage at Lisson Settlement, Kings County in a 20-ha plantation; 25% of the trees (2-3 m high) were severely bent over, some lying on the ground in a 70-ha plantation at Nine Mile Brook, Gloucester County.
Spruce bud midge *Rhabdophaga swainei* Felt	Spruce	Region	This insect, which attacks and kills the buds of spruces, was common throughout the Region but populations remained low. (See also: Plantation survey of white spruce.)
Spruce bud scale *Physokermes piceae* (Schr.)	Black spruce Red spruce White spruce Balsam fir	N.B.	Populations persisted in spruce plantations in Victoria and Madawaska counties but damage appeared negligible, high populations were present on roadside black spruce at Sunnyside and low populations on balsam fir at km 25 on the Rapids Depot Road, Restigouche County, low levels on red spruce km 8 on the Lepreau-McDougall Lake Road, Charlotte County.

Spring cankerworm *Paleacrita vernata* (Peck)	Apple Elm	N.S.	This insect, in association with the winter moth, caused moderate and severe defoliation near Windsor and Falmouth, Hants County, Kentville, Kings County, and West Paradise, Annapolis County.
Spruce coneworm *Dioryctria reniculelloides* Mut. & Mun.	White spruce Red spruce Black spruce Balsam fir	Region	Larvae were collected from many points in the Region but populations remained generally low.
Spruce twig aphid *Mindarus obliquus* (Cholod)	White spruce Red spruce	N.B. N.S.	Present at various levels of intensity at scattered locations in York, Sunbury, Kings, Victoria, Carleton, and Restigouche counties, New Brunswick and Pictou County, Nova Scotia. (See also: Plantation survey of white spruce.)
Twoleaf tier *Psilocorsis cryptolechiella* (Cham.)	Beech Wire birch	Region	In New Brunswick, the insect was common in beech stands in the Fredericton area and near Brockway on the southern end of the Tweedside Road, York County, where 20 and 30% of the foliage, respectively, was affected. Populations were low elsewhere in the Province. In Nova Scotia, low populations were observed in beech stands in Pictou and Colchester counties and on wire birch in Annapolis County. In Prince Edward Island, very low populations occurred on beech in Kings and Queens counties.
Uglynest caterpillar *Archips cerasivoranus* (Fitch)	Cherry	N.B.	Roadside nests were most commonly found in parts of Kings County but were also noted in York, Kent, and Northumberland counties.
Whitemarked tussock moth *Orgyia leucostigma* (J.E. Smith)	Conifers Hardwoods	Region	Populations of this economically important forest pest remained at the endemic level in 1982.
White pine weevil *Pissodes strobi* (Peck)	White pine Norway spruce Jack pine Red pine Scots pine Red spruce Douglas fir	Region	Damage was again widespread on a variety of coniferous species throughout the Region. In New Brunswick, 70% of Norway spruce was infested in a plantation at Dumfries, York County, counts of white pine at five locations in Northumberland and Kent counties show 45% infestation level.

INSECT OR DISEASE	HOST(S)	LOCALITY	REMARKS
Willow flea weevil *Rhynchaenus rufipes* (Lec.)	Bayleaf willow	Region	In New Brunswick, severe browning of ornamental willows occurred at various locations in Kent, Westmorland, and York counties, but overall populations were much reduced from 1981. Severe browning of bayleaf willow occurred in locations scattered throughout much of Nova Scotia and in Queens and Prince counties, Prince Edward Island.
Winter drying	Scots pine Red pine Spruce	N.B. P.E.I.	Winter drying occurred throughout much of New Brunswick and Prince Edward Island but generally discoloration of foliage was much less than in 1981, both in area and intensity. Plantations, hedgerows, and ornamental trees were affected at numerous locations.
Winter moth *Operophtera brumata* (L.)	Apple Elm Linden	Region	In Nova Scotia, moderate and severe defoliation of apple occurred at Kingston and Gaspereau, Kings County, Falmouth, McKay Section, and Brooklyn, Hants County, Upper Economy, Colchester County, Middleton, Clarence, and West Paradise, Annapolis County, Liverpool and Brooklyn, Queens County, Shinimicas Bridge and Oxford, Cumberland County and Yarmouth, Yarmouth County; in Prince Edward Island, moderate defoliation of apple at Pinette and near Hunter River, Queens County and Fortune Bridge, Kings County, light defoliation of a few elm and linden trees at Charlottetown, Queens County, and Morell, Kings County; in New Brunswick, this insect was collected from elm at Hillsborough, Albert County.
Winter storm	Balsam fir Norway spruce Red pine White pine Scots pine White birch Cherry	N.S. P.E.I.	Freezing rain and wet snow caused a few broken tops and branches on scattered balsam fir, Norway spruce, red, and white pine trees in Pictou, Colchester, Halifax, and Inverness counties, Nova Scotia. In Prince Edward Island, broken tops and severe branch damage of a few Scots pine, white birch, and cherry trees occurred in a 1-ha area near Kingston, Queens County.

Yellowheaded spruce sawfly *Pikonema alaskensis* (Roh.)	Black spruce White spruce	Region	In Nova Scotia, severe defoliation of young black spruce trees occurred in a small plantation at Grants Lake, Pictou County, of a few trees at McLeod Lake, Cape Breton County, of a few white spruce at Sheet Harbour, Halifax County. In Prince Edward Island, defoliation of black spruce occurred in a 29-year-old, 5-ha plantation of black and Norway spruce at Grand River, Prince County where analysis showed 33% of light foliage damage, 7% moderate, and 7% severe. Severe defoliation of the tops of some trees occurred at East Bideford, Prince County. Populations were low in New Brunswick.